4.12 Test Excavation 227 (T-227)

***Ahupua‘a*:**	Honolulu
LCA:	7712:6
TMK #:	2-1-027
Elevation Above Sea Level:	1.54 m
UTM:	617987.9392 m E, 2356057.668 m N
Max Length/Width/Depth:	7.26 m/0.70 m/1.35 mbs
Orientation:	54/234° TN
Targeted Project Component:	Utility Relocation
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 227 (T-227) was located in the right lane of Punchbowl Street, near its intersection with Pohukaina Street. T-227 was adjacent to the berm of the roadway, approximately 0.63 m from the sidewalk curb. A waterline was located 1.1 m to the east, parallel with the excavation. T-227 was located on property owned by the City and County of Honolulu. The excavation area was level with the surrounding land surface.

Summary of Background Research and Land Use: Land Court Application 345 Map 1 indicates that T-227 was originally situated on land awarded to V. Kamāmalu as part of LCA 7712/7713. S. E. Bishop’s 1884 map of the Kewalo area of Honolulu indicates that T-227 was located approximately 30 m southeast of the former shoreline within an unnamed road leading to the “Immigrant Depot” (on present-day Ala Moana Boulevard). In an 1887 map of Honolulu by W. A. Wall, the unnamed road is labeled Kaka‘ako Street, and the area of the former shoreline has become reclaimed land with proposed development, moving the shoreline to below present-day Ala Moana Boulevard. According to M. D. Monsarrat’s 1897 map of Honolulu, the location of T-227 was still an undeveloped area, near a small street intersecting with Punchbowl Street. In Newton’s 1904 map of Honolulu the small street has become an extension of Punchbowl Street and the location of T-227 was next to the Honolulu Iron Works. The 1919 U.S. Army War Department Fire Control map depicts the location of T-227 as within Punchbowl Street.

Two previous archaeology studies have been conducted in the vicinity of T-227. In 1985, excavations conducted at the former location of the Honolulu Iron Works encountered five human burials in a parcel of land between Punchbowl Street, South Street, Pohukaina Street, and Ala Moana Boulevard (Yent 1985). The Department of Land and Natural Resources conducted the fieldwork and identified the burials in a sand deposit within burial pits located beneath approximately 1 m of fill. The exact location of the five burials within the study area was not recorded, although the report notes the construction site as being at the intersection of Punchbowl Street and Pohukaina Street. The northwestern border of the study area at this intersection is less than 25 m southeast of T-227. All five burials were designated SIHP #50-80-14-2918 and were disinterred.

Between 1986 and 1988, CSH conducted archaeological monitoring within the Hawai‘i Community Development Authority’s Kaka‘ako Improvement District 1 (ID-1), which included

Punchbowl Street and the location of T-227 (Pfeffer et al. 1993). A total of 149 burials were documented and disinterred during archaeological monitoring within ID-1 from four specific burial areas. They consist of Queen Street (116 burials, SIHP #50-80-14-4534), South Street (31 burials, SIHP #50-80-14-3712), Halekauwila Street (1 burial, SIHP #50-80-14-4532), and Punchbowl Street (1 burial, SIHP #50-80-14-4533). The burial identified on Punchbowl Street was located at the King Street intersection, approximately 510 m northeast of T-227.

Documentation Limitations: T-227 was excavated to a maximum depth of 1.35 mbs. The water table was encountered at 1.26 mbs. There were no factors that limited documentation of T-227. A backhoe was used to remove the upper fill strata and expose the underlying natural sediment. All of the natural sediment within T-227 was hand-excavated to the coral shelf.

Stratigraphic Summary: The stratigraphy of T-227 consisted of fill overlying the former land surface and natural sediment to the coral shelf. Observed strata were asphalt (Ia), gravel base course (Ib), silty loam fill (Ic), extremely gravelly and cobbly sandy loam fill (Id), a silty sand buried cultural A-horizon (II), natural Jaucas sand (III), natural gleyed silty sand (IV), and the coral shelf (V). The buried A-horizon (II) was considered to be a subsurface cultural deposit and was designated as a component of SIHP #-2918. The stratigraphy of T-227 did not conform to the USDA soil survey designation of Fill land below Stratum Id.

Artifacts Discussion: A total of 30 historic artifacts (Acc. #s 227-A-1 through A-30), see following table and photographs) were collected from T-227, including 41 ceramic fragments from a minimum of nine vessels, 15 glass fragments from six bottles, and 15 miscellaneous items. Historic artifacts were collected from the imported fill (Stratum Ic) and from the buried A-horizon (Stratum II, part of SIHP #-2918). Stratum Ic artifact is an olive-colored glass fragment. Artifacts collected from Stratum II (SIHP #-2918) consist of 41 ceramic fragments, nine bottle glass fragments from three bottles, a shank button, a celluloid comb fragment, a marble, and seven red brick fragments. The bottle glass fragments dated from the 1870s to the 1920s. The ceramics were all Euro-American wares except for two German stoneware bottles that were probably exported to Hawai‘i before 1920. Historic artifacts were also encountered within several pit features (SIHP #-2918 Features 14, 16, and 17) extending from the buried A-horizon (Stratum II) into the natural Jaucas sand (Stratum III) (see Features Discussion below). SIHP #-2918 Feature 14 contained a bottle glass fragment. SIHP #-2918 Feature 16 contained unidentified rusted metal and bottle glass. SIHP #-2918 Feature 17 contained an oblong, tapered, ivory bead and a possible glass candlestick holder.

Features Discussion: A total of seven features (Features 14–21) were identified as components of the buried A-horizon (Stratum II) which were intrusive into underlying natural Jaucas sand (Stratum III). Each feature was bisected, the sediment was screened, and any artifacts were collected. The remaining halves of the features were excavated similarly and bulk samples were collected for further sample processing, with the exclusion of Feature 20, which was mostly in the sidewall and had little content within the excavation area. The buried A-horizon and the seven features within T-227 were designated as components of SIHP #-2918 (see Volume I). SIHP #-2918 was also identified within T-226A, T-226B, T-226C, T-226D, and T-227A.

SIHP #-2918 Feature 14 had an irregular outline and extended from 0.90–1.07 mbs in the northern end of T-227. A bulk sample was collected from SIHP #-2918 Feature 14 (see Sample Results below). A butchered rib fragment from a cow (*Bos taurus*) was encountered during the

excavation of SIHP #-2918 Feature 14. SIHP #-2918 Feature 15 was a substantial sub-feature of SIHP #-2918 Feature 14 and was encountered after bisecting SIHP #-2918 Feature 14. SIHP #-2918 Feature 15 was circular with a diameter of approximately 22 cm and extended from 0.93–1.13 mbs. SIHP #-2918 Feature 15 was likely a postmold, and SIHP #-2918 Feature 14 is interpreted as a potential pit of indeterminate function, possibly relating to the infilling of the postmold.

SIHP #-2918 Feature 16 had a roughly circular outline and extended from 1.01–1.17 mbs. It was approximately 0.65 m long, extending 0.40 m into the excavation from the northwest sidewall. The sediment content within the feature was very cobbly and contained many rootlets and organic material at the base. A bulk sample was collected from SIHP #-2918 Feature 16 (see Sample Results below). An unidentified faunal long bone shaft was encountered during the excavation of SIHP #-2918 Feature 16, originating from a medium-sized mammal. SIHP #-2918 SIHP #-2918 Feature 16 is interpreted as a pit of indeterminate function.

SIHP #-2918 Feature 17 had a roughly ovoid outline and extended from 1.05–1.16 mbs. It extended approximately 0.70 m into the excavation from the southeast sidewall and was approximately 0.35 m wide. The upper portion of SIHP #-2918 Feature 17 contained an oblong and tapered ivory bead, an unknown rusted metal piece, and two pig (*Sus scrofa*) molars which were found above a possible glass candlestick holder, cobbles, and rootlets at the bottom of the feature. A bulk sediment sample was collected from SIHP #-2918 Feature 17 (see Sample Results below). SIHP #-2918 Feature 17 is interpreted as a pit of indeterminate function.

SIHP #-2918 Feature 18 had an ovoid outline and extended from 1.00–1.05 mbs. It extended 0.25 m into the excavation from the northwest sidewall and was 0.25 m wide. A bulk sample was collected from Feature 18 (see Sample Results below). SIHP #-2918 Feature 18 is interpreted as a potential pit of indeterminate function.

SIHP #-2918 Feature 19 was mostly circular with a diameter of 0.15 m, and it extended from 1.00–1.22 mbs. A bulk sample was collected from SIHP #-2918 Feature 19 (see Sample Results below). SIHP #-2918 Feature 19 is interpreted as a pit of indeterminate function.

SIHP #-2918 Feature 20 was mostly circular, extending into the excavation 0.12 m from the northwest sidewall in the southern end of T-227 from 0.98–1.02 mbs. The feature was bisected and the sediment was screened. No bulk sample was collected due to the small size of the feature, and no cultural material was observed during the excavation. SIHP #-2918 Feature 20 is interpreted as a potential pit of indeterminate function.

SIHP #-2918 Feature 21 was irregularly shaped and extending from 1.00–1.19 mbs. A bulk sample was collected from SIHP #-2918 Feature 21 (see Sample Results below). SIHP #-2918 SIHP #-2918 Feature 21 is interpreted as a potential pit of indeterminate function.

Terrestrial Faunal Remains Discussion: Faunal remains were collected individually during excavation from Stratum II (SIHP #-2918), a general collection from 0.49–1.12 mbs, as well as feature-specific collections from SIHP #-2918 Feature 14 (0.90–1.07 mbs), SIHP #-2918 Feature 16 (1.00–1.07 mbs), and SIHP #-2918 Feature 17 (1.05–1.16 mbs). The general collection from Stratum II contained *Bos taurus* and *Sus scrofa* skeletal elements, the majority of which had been butchered with a metal saw blade. SIHP #-2918 Feature 14 contained a single *Bos taurus* rib that had been butchered with a metal saw blade. SIHP #-2918 Feature 16 contained unmodified

medium mammal diaphysis fragments, and SIHP #-2918 Feature 17 contained unmodified *Sus scrofa* molar fragments (that mend). *Sus scrofa* is a Polynesian introduction common in both pre- and post-Contact contexts. *Bos taurus* was a post-Contact introduction.

Sample Results: A total of six bulk sediment samples were collected from SIHP #-2918 Features 14, 16–19, 21 within T-226B. All of the sediment samples were wet screened. Sample analysis revealed the presence of charcoal, midden, naturally-deposited shell (non-midden), historic artifacts, and faunal remains in Stratum II pit features (SIHP #-2918 Features 14, 16–19, and 21).

A two-liter bulk sediment sample was collected from SIHP #-2918 Feature 14 between 0.90 and 1.07 mbs. The sample contained charcoal (3.5 g), *Brachidontes crebristriatus* (1.1 g), gastropods (0.6 g), bottle glass (0.7 g), and fish remains (0.1 g).

A two-liter bulk sediment sample was collected from SIHP #-2918 Feature 16 between 1.00 and 1.17 mbs. The sample contained charcoal (0.3 g), naturally-deposited shell (0.8 g), rusted metal (0.9 g), and bottle glass fragments (0.2 g).

A two-liter bulk sediment sample was collected from SIHP #-2918 Feature 17 between 1.05 and 1.16 mbs. The sample contained charcoal (0.4 g), *Cardita thaanumi* (0.2 g), *Nerita picea* (0.1 g), rusted metal (4.8 g), aqua bottle glass (2.6 g), medium mammal remains (0.5 g), fish remains (0.1 g), and marine shell midden (3.3 g). Midden collected included *Brachidontes crebristriatus* (1.2 g), *Tellina palatam* (1.7 g), *Tellina* sp. (0.1 g), and *Echinothrix diadema* sp./*Echinometra mathaei* sp. (0.3 g).

A one-liter bulk sediment sample was collected from SIHP #-2918 Feature 18 between 1.00 and 1.05 mbs. The sample contained charcoal (0.1 g), naturally-deposited shell fragments (0.4 g), *Echinothrix diadema* sp. (0.1 g), and fish remains (0.1 g).

A two-liter bulk sediment sample was collected from SIHP #-2918 Feature 19 between 1.00 and 1.22 mbs. The sample contained charcoal (1.0 g), naturally-deposited *Hipponix* spp. (0.2 g), and marine shell midden (2.9 g). Midden collected included *Turbo sandwicensis* (1.7 g), *Echinometra mathaei* sp. (0.7 g), and *Planaxis ponderosa* (0.5 g).

A two-liter bulk sediment sample was collected from SIHP #-2918 Feature 21 between 1.00 and 1.19 mbs. The sample contained charcoal (0.8 g), naturally-deposited limpets and gastropods (0.5 g), ceramic fragments (0.3 g), and shell midden (2.6 g). Midden collected included *Tellina palatam* (1.3 g), *Brachidontes crebristriatus* (0.5 g), *Turbo sandwicensis* (0.4 g), Crustacea fragments (0.2 g), and *Echinothrix diadema* sp./*Echinometra mathaei* sp. (0.2 g).

GPR Discussion: A review of amplitude slice maps indicated no linear features that might have indicated the presence of utilities. Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.5 mbs.

GPR depth profiles for T-227 identified horizontal banding, commonly associated with stratigraphic layering throughout the survey area. This banding corresponds to variations in density and chemical composition within fill deposits. The profile also indicated a change in reflectivity occurring around 0.25 mbs. No utilities were observed in the profile. The maximum depth of clean signal return was approximately 1.0 mbs.

Summary: T-227 was excavated to a maximum depth of 1.35 mbs. The water table was encountered at 1.26 mbs. The stratigraphy consisted of fill strata (Ia–Id) overlying the former land surface (II) and natural sediment (III–IV) to the coral shelf (V). The stratigraphy of T-227 did not conform to the USDA soil survey designation of Fill land. The buried A-horizon (Stratum II) was considered to be a component of SIHP #-2918, a subsurface cultural deposit encompassing the area. A total of seven features (14–21) were identified extending from the base of the culturally-enriched A-horizon (II) and into the natural Jaucas sand (III). SIHP #-2918 Feature 15 appeared to be a postmold, while SIHP #-2918 Features 14 and 16–21 were of indeterminate function. Overall, material collected from SIHP #-2918 Features 14–21 and from the buried A-horizon (II) consisted of charcoal, various shell, unidentified fish remains, historic artifacts (including an ivory bead, glass fragments, ceramic sherds, rusted metal pieces, and a possible glass candlestick holder), and butchered faunal remains from *Bos taurus* and *Sus scrofa*. The faunal material likely represents food remains. The presence of the seven features extending from Stratum II into Stratum III indicated that the former land surface was an activity area. The seven features within T-227 were designated as Features 14–21 of SIHP #-2918. The buried A-horizon (SIHP #50-80-14-2918) was also identified within T-226A, T-226B, T-226C, T-226D, and T-227A (see Volume I).

T-227 at the start of excavation, view to the east

T-227 southeast wall profile, view to the southeast

Bisected SIHP #-2918 Feature 15 at north end of T-227, view to the northeast

Bisected SIHP #-2918 Feature 16 near north end of T-227, view to the southwest

Close-up of bisected SIHP #-2918 Feature 17 in central portion of T-227, showing rusted metal, possible glass candlestick holder, and cobbles; view to the northeast

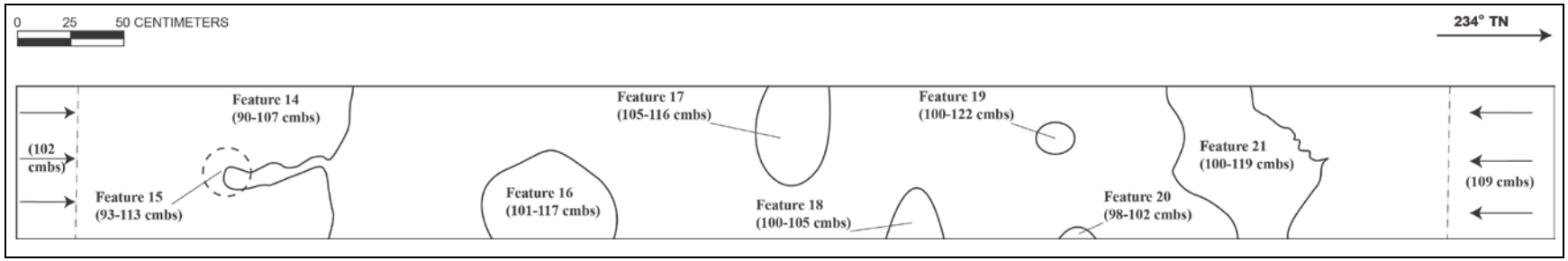
Bisected SIHP #-2918 Feature 18 in center portion of northwest sidewall of T-227, view to the west

Bisected SIHP #-2918 Feature 19 near southern end of T-227, view to the southeast

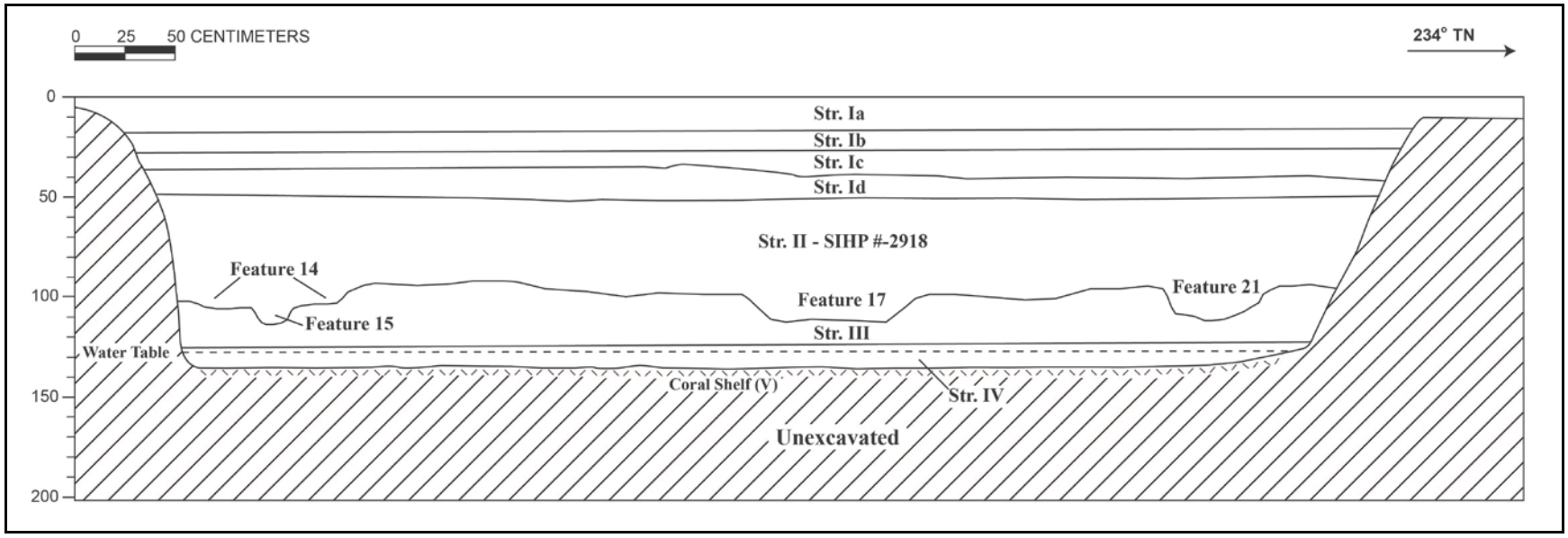
Bisected SIHP #-2918 Feature 20 near southern end of T-227, view to the west

Bisected SIHP #-2918 Feature 21 in southern end of T-227, view to the southwest

T-227 plan view at Stratum II/Stratum III interface, view to the northeast



T-227 plan view of the Stratum II/Stratum III interface showing SIHP #-2918 Features 14–21



T-227 southeast wall profile showing SIHP #-2918 Features 14, 15, 17, and 21

T-227 Stratigraphic Description

Stratum	Depth (cmbs)	Description
Ia	0–17	Asphalt; road surface
Ib	16–27	Fill; 10 YR 5/1 (gray); extremely gravelly sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; crushed basalt gravel base course fill
Ic	26–41	Fill; 10 YR 5/4 (yellowish brown); silty loam; weak, fine crumb structure; moist, friable consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; imported fill; contained glass fragment (collected) and ceramic sherd (not collected)
Id	41–52	Fill; 10 YR 5/8 (yellowish brown); extremely gravelly and cobbly sandy loam; structureless, single-grain; moist, loose consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; imported fill
II	49–112	Natural; A-horizon; 10 YR 5/2 (grayish brown); silty sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, wavy lower boundary; few, medium to coarse roots; contained red brick, glass fragments, ceramic sherds, ceramic button, ivory bead (collected); buried former land surface; includes Features 14–21; component of SIHP #-2918
SIHP #-2918 Feature 14	90-107	Pit feature originating from Stratum II; silty sand; contained charcoal, glass fragments, fish bone, and faunal bone
SIHP #-2918 Feature 15	93-113	Sub-feature of Feature 14; silty sand; likely a postmold
SIHP #-2918 Feature 16	101-117	Pit feature originating from Stratum II; very cobbly silty sand with organic material at the base; contained charcoal, rusted metal, glass fragments, and faunal bone
SIHP #-2918 Feature 17	105-116	Pit feature originating from Stratum II; silty sand; contained an ivory bead, metal, a possible glass candlestick holder, glass fragments, charcoal, faunal bone, fish bone, and marine shell midden
SIHP #-2918 Feature 18	100-105	Pit feature originating from Stratum II; silty sand; contained charcoal and fish bone
SIHP #-2918 Feature 19	100-122	Pit feature originating from Stratum II; silty sand; contained charcoal and marine shell midden
SIHP #-2918 Feature 20	98-102	Pit feature originating from Stratum II; silty sand; no cultural material observed
SIHP #-2918 Feature 21	100-119	Pit feature originating from Stratum II; silty sand; contained charcoal, marine shell midden, and ceramic fragments

Stratum	Depth (cmbs)	Description
III	90–126	Natural; 10 YR 7/4 (pale brown); sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; diffuse, smooth lower boundary; Jaucas sand
IV	126–135	Natural; GLEY 1 4/N (dark gray); silty sand; structureless, single-grain; wet, non-sticky consistency; non-plastic; marine origin; abrupt, smooth lower boundary
V	135 (BOE)	Natural; 10 YR 7/4 (very pale brown); bedrock-limestone; structureless, massive; moist, weakly to strongly cemented; discontinuous consistency; non-plastic; marine origin; lower boundary not observed; Pleistocene coral shelf

T-227 Historic Artifacts Analysis Table

Acc. #227 -A-	Prov.	Ceramic Vessel Type	Portion	No.	Paste	Origin; Age	Comments
1	T-227, St. II, SIHP #-2918	Holloware – possible pitcher	Body/base (7); base (2); body (10); rim (4); handle (1)	24	Refined earthenware	Euro-American	Whiteware; no decoration
2	T-227, St. II, SIHP #-2918	Bottle – mineral water/ ale	Body	7	Stoneware	German; pre-1920	Dark brown glaze
3	T-227, St. II, SIHP #-2918	Bottle – mineral water/ ale	Body	1	Stoneware	German; pre-1920	Brown–orange glaze
4	T-227, St. II, SIHP #-2918	Holloware – nappy	Body	1	Refined earthenware	Euro-American	Whiteware; purple flower garland near rim; painted underglaze
5	T-227, St. II, SIHP #-2918	Holloware, large bowl	Body	1	Yellowware earthenware	Euro-Ameircan	Yellowware; no decoration
6	T-227, St. II, SIHP #-2918	Tableware – Unidentified	Body	1	Refined earthenware	Euro-American	Whiteware; blue and pink floral, painted underglaze
7	T-227, St. II, SIHP #-2918	Holloware – possible bowl	Body	1	Refined earthenware	Euro-American	Whiteware; green floral, painted underglaze
8	T-227, St. II, SIHP #-2918	Flatware – plate	Base	1	Refined earthenware	Euro-American	Whiteware
9	T-227, St. II, SIHP #-2918	Holloware – large bowl	Body (3); rim (1)	4	Refined earthenware	Euro-American	Whiteware; no decoration; possibly two vessels
Acc. #227 -A-	**Prov.**	**Glass Bottle Type**	**Portion**	**No.**	**Color**	**Origin; Age**	**Comments**
10	T-227, St. Ic	Bottle	Base	1	Olive	pre-1920	Base: push up
11	T-227, St. II, SIHP #-2918	Bottle, milk	Body	3	Clear	1870s – post	“HA”/ “PROPERT[Y]”/ “K. YAMASH”/ “PHO” embossing
12	T-227, St. II, SIHP #-2918	Bottle	Body	1	Olive		“T” (NET?) embossing
13	T-227, St. II, SIHP #-2918	Bottle, spirits	Body (4); base (1)	5	Olive	1870s–1920s	“N” embossed on base; Base: push up
14	T-227, St. II, Fea. 14, SIHP #-2918	Bottle	Body	1	Olive		
15	T-227, St. II, Fea. 16, SIHP #-2918	Bottle	Body	4	Brown, light		

Acc. #227 -A-	Prov.	Miscellaneous Type	Portion	No.	Material	Origin; Age	Comments
16	T-227, St. II, SIHP #-2918	Spike?	Fragment	1	Metal		Very corroded
17	T-227, St. II, SIHP #-2918	Spike, rail	Complete	1	Metal		Bi-tapering, broken head
18	T-227, St. II, SIHP #-2918	Utility pipe?	Fragment	1	Metal		Very corroded
19	T-227, St. II, SIHP #-2918	Roofing tile?	Fragment	1	Stone		
20	T-227, St. II, SIHP #-2918	Tile	Body	1	Earthenware		White glazed tile
21	T-227, St. II, SIHP #-2918	Marble	Fragment	2	Glass		Opaque and clear
22	T-227, St. II, SIHP #-2918	Button	Complete	1	Glass		No holes; wire shank
23	T-227, St. II, SIHP #-2918	Comb	Fragment	1	Celluloid		Long tines; possibly a hair ornament rather than a true comb
24	T-227, St. II, SIHP #-2918	Asphalt/brick	Fragment	20	Composite		Small fragments
25	T-227, St. II, SIHP #-2918	Brick	Fragment	1	Fired clay		Red color
26	T-227, St. II, SIHP #-2918	Brick	Fragment	1	Fired clay		Red color; machine-made
27	T-227, St. II, SIHP #-2918	Brick	Fragment	5	Fired clay		Red color; possible mold mark; raised lip
28	T-227, St. II, Fea. 14, SIHP #-2918	Nail	Fragment	1	Metal		Too corroded to see cross-section shape
29	T-227, St. II, Fea. 17, SIHP #-2918	Candlestick holder?	Complete	1	Glass		Floral pattern
30	T-227, St. II, Fea. 17, SIHP #-2918	Bead	Complete	1	Ivory		Ivory bead; possibly from a necklace

T-227 Euro-American whiteware fragments, probably from one pitcher (Acc. #227-A-1) from Stratum II (SIHP #-2918)

T-227 German stoneware fragments (Acc. #s 227-A-2 and A-3) from two bottles from Stratum II (SIHP #-2918)

T-227 ceramic fragments, exterior; Euro-American ceramic fragments from three decorated whiteware and one yellowware vessel (Acc. #s 227-A-4 through A-7; top row, left to right), and fragments from two to three undecorated whiteware vessels (Acc. #s 227-A-8 and A-9; bottom) from Stratum II (SIHP #-2918)

T-227 ceramic fragments, interior (Acc. #s 227-A-4 through A-9) from Stratum II (SIHP #-2918)

T-227 glass bottle fragments (Acc. #s 227-A-11 through A-13) from Stratum II (SIHP #-2918)

T-227 miscellaneous artifacts (Acc. #s 227 A-16 through A-19, and A-21 through A-23) from Stratum II (SIHP #-2918)

T-227 pressed glass artifact, possible candlestick holder, (Acc. #227-A-29) from SIHP #-2918 Feature 17

T-227 machine-drilled ivory bead (Acc. #227-A-30) from SIHP #-2918 Feature 17

T-227 Faunal Analysis Table

Acc. #	Stratum	Depth (cmbs)	Feature	Family/Class	Species	Element	Description	Modification
227-F-1	II	49–112	-	Bovidae	*Bos taurus* (cow)	Scapula; vertebra spinous process; vertebrae; humeral condyle (distal portion); tibia diaphysis section; tibia (distal portion); distal femoral condyle (anterior portion); distal femoral condyle (posterior portion)	Fragments	Scapula, vertebrae, humeral condyle (distal portion), tibia diaphysis section, distal femoral condyle (anterior portion), and distal femoral condyle (posterior portion) – butchered (cut with metal blade)
227-F-2	II	49–112	-	Suidae	*Sus scrofa* (pig)	Cranial; scapula; mandible with molars and premolars; mandible with molars and premolars; tusk; innominate fragment (pieces mend)	Fragments	Cranial and scapula – butchered (cut with metal blade)
227-F-3	II	90–107	SIHP #-2918 Feat. 14	Bovidae	*Bos taurus* (cow)	Rib	Fragment	Rib butchered (cut with metal blade)
227-F-4	II	100–107	SIHP #-2918 Feat.16	Mammalia	Medium mammal	Diaphysis sections	Fragments	None
227-F-5	II	105–116	SIHP #-2918 Feat.17	Suidae	*Sus scrofa* (pig)	Molars (pieces mend)	Fragment	None

4.13 Test Excavation 227A (T-227A)

***Ahupua‘a*:**	Honolulu
LCA:	7712:6
TMK #:	2-1-027 [Plat]
Elevation Above Sea Level:	1.55 m
UTM:	617986.6598 mE, 2356052.388 mN
Max Length/Width/Depth:	7.33 m/0.75 m/1.4 mbs
Orientation:	46/226° TN
Targeted Project Component:	Utility Relocation
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 227A (T-227A) was located in the right center lane of Punchbowl Street, near its intersection with Pohukaina Street. T-227A was within 4 m of T-227. T-227A was added for further testing of the utility relocation due to the presence of cultural material and sand in T-227. Two waterlines were located parallel to T-227A, one 1.1 m to the northwest and another 1.0 m to the southeast. T-227A was located on property owned by the City and County of Honolulu. T-227A was added to further investigate subsurface cultural deposits designated SIHP #50-80-14-2918. The excavation area was level with the surrounding land surface.

Summary of Background Research and Land Use: Land Court Application 345 Map 1 indicates that T-227A was originally situated on land awarded to V. Kamāmalu as part of LCA 7712/7713. S. E. Bishop’s 1884 map of the Kewalo area of Honolulu indicates that T-227A was located approximately 34 m southeast of the former shoreline, within an unnamed road leading to the “Immigrant Depot” (on present-day Ala Moana Boulevard). In an 1887 map of Honolulu by W. A. Wall, the former unnamed road is labeled Kaka‘ako Street, and the area of the former shoreline has become reclaimed land with proposed development, moving the shoreline to below present-day Ala Moana Boulevard. According to M. D. Monsarrat’s 1897 map of Honolulu, the location of T-227A was still an undeveloped area, near a small street intersecting with Punchbowl Street. In Newton’s 1904 map of Honolulu the small street has become an extension of Punchbowl Street, and the location of T-227A is next to the Honolulu Iron Works. The 1919 U.S. Army War Department Fire Control map indicates the location of T-227A as within Punchbowl Street.

Two previous archaeology studies have been conducted in the vicinity of T-227A. In 1985, excavations conducted at the former location of the Honolulu Iron Works encountered five human burials in a parcel of land between Punchbowl Street, South Street, Pohukaina Street, and Ala Moana Boulevard (Yent 1985). The Department of Land and Natural Resources conducted the fieldwork and identified the burials in a sand deposit within burial pits located beneath approximately 1 m of fill. The exact location of the five burials within the study area was not recorded, although the report notes the construction site as being at the intersection of Punchbowl Street and Pohukaina Street. The northwestern border of the study area at this intersection is approximately 20 m southeast of T-227A. All five burials were designated SIHP #50-80-14-2918 and were disinterred.

Between 1986 and 1988, CSH conducted archaeological monitoring within the Hawai‘i Community Development Authority’s Kaka‘ako Improvement District 1 (ID-1), which included Punchbowl Street and the location of T-227A (Pfeffer et al. 1993). A total of 149 burials were documented and disinterred during archaeological monitoring within ID-1 from four specific burial areas. They consist of Queen Street (116 burials, SIHP #50-80-14-4534), South Street (31 burials, SIHP #50-80-14-3712), Halekauwila Street (1 burial, SIHP #50-80-14-4532), and Punchbowl Street (1 burial, SIHP #50-80-14-4533). The burial identified on Punchbowl Street was located at the King Street intersection, approximately 514 m northeast of T-227A.

Documentation Limitations: T-227A was excavated to the coral shelf at a depth of 1.40 mbs. The water table was not encountered during excavation. Excavation was limited in the southern end of T-227A due to the presence of a metal pipe at 0.90 mbs. A backhoe was used to remove the upper fill strata and expose the underlying natural sediment. All of the natural sediment within T-227A was hand-excavated to the coral shelf.

A partial human (infant) burial was encountered at approximately 1.15 mbs in the northern end of the excavation. No burial pit was observed and only skeletal elements from the upper half of the burial were visible, including portions of the skull, humeri, and cervical vertebrae. The age of the individual was determined to be between birth and three years. Excavation was stopped in the immediate vicinity of the burial. The remains were covered and secured and a buffer was established around the burial within the excavation. The burial was designated as Feature 27 of SIHP #-2918.

Stratigraphic Summary: The stratigraphy of T-227A consisted of fill overlying the former land surface and natural sediment to the coral shelf. Observed strata were asphalt (Ia), gravel base course (Ib), loamy sand fill (Ic), silty sand fill (Id), a loamy sand buried cultural A-horizon (II), natural Jaucas sand (III), and natural sand with clay (IV) over the coral shelf (V). The buried A-horizon (II) was designated as a component of SIHP #-2918, a subsurface cultural deposit in the area. The stratigraphy of T-227A did not conform to the USDA soil survey designation of Fill land below Stratum Id.

Artifacts Discussion: Sixteen historic artifacts (Acc. #s 227A-A-1 through A-16, see following table and photographs) were collected, consisting of four ceramic fragments from three Euro-American vessels in Stratum Id, 13 glass fragments from seven bottles in Stratum Id, and nine glass fragments from six bottles in Stratum II. There also were a number of “black” glass bottle fragments from both Strata Id and II; these span from the mouth-blown era into the mold-blown period (pre-1890). One case gin bottle has a pontil mark, indicating that it was mouth blown; case gin bottles were still mouth-blown into the 1920s. The artifacts collected from Strata Id and II likely date from the 1870s to the 1920s.

Fire-cracked rock also was encountered in the buried A-horizon (Stratum II, SIHP #-2918). Additional traditional and historic materials were encountered within the sediment samples obtained from the potential pit features and from Stratum II (A-horizon) (see Sample Results below).

Features Discussion: A total of five features (Features 22–27) were documented within T-227A. Features 22–24 were observed in plan view, while Features 25–27 were observed in the central portion of the southeast sidewall profile. Features 22, 23, 25, and 26 were documented as pit

features originating within Stratum II and extending into Stratum III (Jaucas sand). Feature 24 was documented as a pit feature originating within Stratum III. Feature 27 was a partial infant burial. The buried A-horizon (II), pit Features 22–26, and the infant burial (Feature 27) were designated as components of SIHP #-2918, which was also identified within T-226A, T-226B, T-226C, T-226D, and T-227. SIHP #-2918 Features 1–3 were identified within T-226A, Features 4–11 were identified within T-226B, Features 12, 13, 29, and 30 were identified within T-226C, Feature 28 was identified within T-226D, and Features 14–21 were identified within T-227.

SIHP #-2918 Feature 22 had a square shape in plan view and was located in the central area of the excavation. The feature measured 0.27 m long by 0.25 m wide, originating at the base of Stratum II and extending from 1.03–1.08 mbs. Approximately 6 L of sediment were removed from the feature, screened, and collected for further content analysis. The function of SIHP #-2918 Feature 22 is indeterminate.

SIHP #-2918 Feature 23 originated from the base of Stratum II at 1.08 mbs and terminating at 1.31 mbs as an intrusive pit within Stratum III. SIHP #-2918 Feature 23 was circular in plan and measured approximately 0.2 m in diameter. The sediment matrix of SIHP #-2918 Feature 23 was sandy loam with similar characteristics to Stratum II. Charcoal (0.1 g) was submitted for wood taxa identification, which identified native taxa. Volcanic glass fragments were recovered from the bulk sediment samples (see Sample Results below). SIHP #-2918 Feature 23 is interpreted as a pit of indeterminate function.

SIHP #-2918 Feature 24 had an ovoid shape in plan view. The feature was approximately 17 cm long by 12 cm wide, originating at the base of Stratum III from 1.17–1.30 mbs. The sediment matrix of SIHP #-2918 Feature 24 was sandy loam. Bulk sediment samples were collected for analysis (see Sample Results below). SIHP #-2918 Feature 24 is interpreted as a pit of indeterminate function.

SIHP #-2918 Feature 25 was a tapered pit observed in the southeast sidewall profile of the excavation. The feature had a maximum width of 20 cm originating at the base of Stratum II from 0.94–1.08 mbs. A 1.5-liter bulk sediment sample yielded naturally-occurring marine faunal material (see Sample Results below) and volcanic glass (0.2 g). The volcanic glass is considered to be a traditional Hawaiian artifact. SIHP #-2918 Feature 25 is interpreted as a pit of indeterminate function.

SIHP #-2918 Feature 26 was a straight-edged pit observed in the southeast sidewall profile of the excavation. The feature had a maximum width of 20 cm originating at the diffuse lower boundary of Stratum II and extending into Stratum III from 1.12–1.37 mbs. Bulk sediment samples were collected for analysis (see Sample Results below). SIHP #-2918 Feature 26 is interpreted as a pit of indeterminate function.

SIHP #-2918 Feature 27 was a partial infant burial observed at the base of the Jaucas sand layer (Stratum III) extending into Stratum IV. The burial had no discernible pit outline. The burial was determined to be an infant between 0 and 3 years of age at death based on size and growth development of the remains. Ancestry determination on infant remains is not possible.

Terrestrial Faunal Remains Discussion: Faunal remains were encountered within fill (Stratum Id), the former A-horizon (Stratum II; SIHP #-2918), and Jaucas sand (Stratum III). Osseous remains from Stratum Id included cow (*Bos taurus*) rib and pelvis fragments with characteristic

butcher cut marks and a pig (*Sus scrofa*) ulna fragment, long bone diaphysis sections with cut marks, rib and vertebrae fragments, and incisor fragments. In addition to the terrestrial faunal remains, an unidentified fish vertebra and spine were collected. Faunal remains from Stratum II (SIHP #-2918) were identified as goat (*Capra aegagrus hircus*) cranial fragments, a proximal phalanx, and a vertebral facet portion; a dog (*Canis lupus familiaris*) cranial fragment, teeth (molar and canine), metacarpal fragment, vertebral facet fragment, ulna fragment, and long bone diaphysis portion; and a diaphysis section from an unidentified species, not consistent with human. In addition to the terrestrial faunal remains, an unidentified fish vertebra, spine, and irregular fragments were collected.The presence of goat remains indicates a post-Contact activity. Stratum III contained osseous remains consisting of a *Sus scrofa* canine fragment and also diaphysis sections from an unidentified species, not consistent with human. The majority of the fragmented faunal material collected from T-227A likely represents food remains.

Sample Results: The screened sample from SIHP #-2918 Feature 22 (6 L; 1.03 to 1.08 mbs) yielded shell midden material (1.7 g), fish bones (0.4 g), fire-cracked rock and a brick fragment (106.3 g), and a basalt fragment (13.1 g). The shell material was classified as a *Turbo* sp. operculum (1.1 g), *Tellina palatam* (0.4 g), and *Brachidontes crebristriatus* (0.2 g). The fish bone fragments were not identifiable to the species level.

Sediment samples from SIHP #-2918 Feature 23 (1.08 to 1.31 mbs) included an approximately 4-liter screened sample and a two-liter bulk sample. The results for both samples were combined and yielded <0.1 g of charcoal, 0.5 g of volcanic glass, gastropods (0.3 g), limpets (0.5 g), miscellaneous shell fragments (0.3 g), and 9.2 g of shell midden material, which was classified as *Conus* sp. (2.5 g), *Turbo* sp. operculum (1.2 g), *Brachidontes crebristriatus* (4.0 g), *Theodoxus neglectus* (0.6 g), *Turbo sandwicensis* (0.4 g), Crustacea (0.2 g), Echinoidea spp. (0.1), and a gastropod fragment (0.2 g). Wood taxa analysis was conducted on the charcoal material and was classified as *kōpiko* (cf. *Psychotria* sp.) (0.07 g), *lama* (*Diospyros sandwicensis*) (<0.01 g), and unidentified bark (<0.01 g). *Kōpiko* and *lama* are both native species.

A two liter bulk sediment sample from SIHP #-2918 Feature 24 yielded shell material (3.8 g), osseous remains of a medium mammal (0.1 g), and a shark tooth (0.1 g). The shell material was classified as *Turbo sandwicensis* (1.4 g), *Brachidontes crebristriatus* (1.2 g), *Strombus* sp. (0.9 g), *Echinothrix diadema* sp./*Echinometra mathaei* sp. (0.2 g), and Crustacea (0.1 g).

A 1.5-liter bulk sediment sample from SIHP #-2918 Feature 25 yielded naturally-occurring marine shell (1.0 g), volcanic glass (0.2 g), and fish bone (0.1 g).

A 2-liter bulk sample from SIHP #-2918 Feature 26 yielded medium mammal (possible dog [*Canis lupus familiaris*]) remains (0.5 g), naturally-occurring marine shell (0.7 g), and marine midden consisting of *Nerita picea* (0.8 g).

An additional 76-liter screened sample was collected from Stratum II (A-horizon) from 0.80 to 0.90 mbs for further content analysis. The screened sample from Stratum II (SIHP #-2918) yielded charcoal (3.2 g); naturally-occurring marine shell (2.4 g), marine shell midden (105.7 g); historic artifacts consisting of green, aqua, and clear bottle glass fragments (6.8 g); medium mammal remains (1.2 g); and fish bones (1.2 g). The marine shell midden consisted of *Brachidontes crebristriatus* (25.8 g), *Conus* sp. (18.2 g), *Theodoxus neglectus* (12.9 g), *Strombus* sp. (8.4 g), *Tellina palatam* (8.1 g), *Cypraea caputserpentis* (8.0 g), *Turbo sandwicensis* (5.5 g),

Nerita picea (5.2 g), *Cypraea erosa* (3.7 g), *Trochus* sp. (2.7 g), *Isognomon* sp. (1.2 g), *Drupa* sp. (1.2 g), *Pinctada radiata* (1.1 g), Nassariidae (1.0), *Echinothrix diadema* sp. (0.9 g), Crustacea (0.8 g), Cymatiidae (0.5 g), and *Natica* sp. (0.5 g).

Additional faunal remains and shell midden material were hand-collected from Stratum II (SIHP #-2918) during the excavation of T-227A. The collected faunal remains and shell midden (66.8 g) consisted of *Bilunulatus albotaeniatus* (Hawaiian hogfish; 3.7 g), dog remains (0.4 g), *Tellina palatam* (11.0 g), *Strombus maculates* (10.8 g), *Theodoxus neglectus* (9.1 g), *Turbo sandwicensis* (8.6 g), *Conus* sp. (7.8 g), *Cymatium nicobarium* (7.6 g), *Brachidontes crebristriatus* (4.1 g), *Cypraea caputserpentis* (2.3 g), *Nerita picea* (2.1 g), *Turbo* sp. operculum (1.9 g), and *Isognomon* sp. (1.5 g).

Radiocarbon analysis of the wood identified from SIHP #-2918 Feature 23 yielded three possible date ranges, with a calibrated 2-sigma date of AD 1720 to AD 1810 (51.6%) being the most probable (see Radiocarbon Results below).

Two volcanic glass samples from Stratum II at 0.94–1.08 mbs (SIHP #-2918 Feature 25) and 1.08–1.31 mbs (SIHP #-2918 Feature 23) were sent for EDXRF analysis. Specific source information was not available; however, the volcanic glass sample clearly does not match sources from Hawai‘i Island. The sample from Stratum II at 0.94–1.08 mbs (SIHP #-2918 Feature 25) was from “Group 2,” while the sample from Stratum II at 1.08–1.31 mbs (SIHP #-2918 Feature 23) was from “Group 1.” Only these two distinct geochemical groups were identified from the 35 City Center AIS EDXRF volcanic glass samples, likely representing different volcanic sources on O‘ahu (see EDXRF discussion in Volume V).

GPR Discussion: A review of amplitude slice maps indicated no linear features, although a utility was encountered during excavation. Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.25 mbs.

GPR depth profiles for T-227A identified horizontal banding, commonly associated with stratigraphic layering throughout the survey area. This banding corresponds to variations in density and chemical composition within fill deposits. The profile also indicated a change in reflectivity occurring around 0.25 mbs. No utilities were observed in the profile; however, a utility was encountered during excavation. The maximum depth of clean signal return was approximately 0.8 mbs.

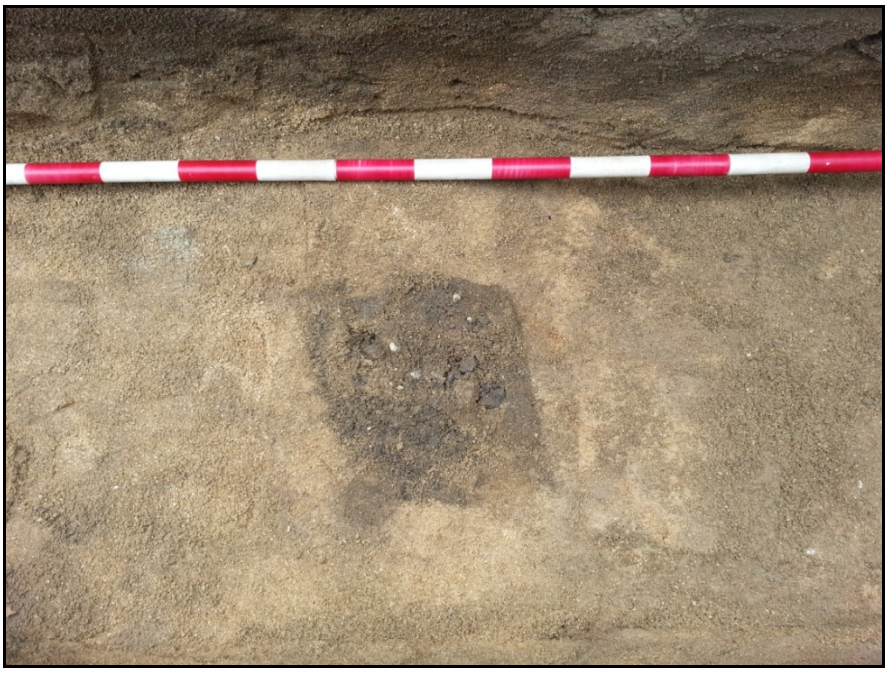
Summary: T-227A was excavated to the coral shelf at a depth of 1.40 mbs. The water table was not encountered during excavation. The stratigraphy consisted of fill strata (Ia–Id) overlying the former land surface (II) and natural sediment (III–IV) to the coral shelf (V). The stratigraphy of T-227A did not conform to the USDA soil survey designation of Fill land below Stratum Id. Artifacts observed from the lowermost fill layer (Stratum Id) consisted of broken bottle glass and ceramic fragments dating from the late 1800s to early 1900s. Overall, material contained within the features and Stratum II (former A-horizon) consisted of various shell midden and naturally-occurring shell species. A total of five features (SIHP #-2918 Features 22–27) were documented within T-227A. SIHP #-2918 Features 22, 23, 25, and 26 were documented as pit features originating within Stratum II and extending into Stratum III (Jaucas sand). Feature 24 was documented as a pit feature originating within Stratum III. SIHP #-2918 Feature 27 was a partial

infant burial observed at the base of the Jaucas sand layer (Stratum III) extending into Stratum IV. The burial was determined to be an infant between 0 and 3 years of age at death based on size and growth development of the remains. Ancestry determination on infant remains is not possible; however, the infant's ancestry is most likely Native Hawaiian, which is supported by the stratigraphic context below the former A-horizon (Stratum II). A small amount of fish bone, including a shark tooth, was collected from SIHP #-2918 Features 22, 24, and 25. SIHP #-2918 Feature 22 also contained fire-cracked rock and a red brick fragment. SIHP #-2918 Feature 23 contained charcoal, which was identified as originating from native trees—*kōpiko* and *lama*. SIHP #-2918 Feature 25 also contained volcanic glass, which is considered to be a traditional Hawaiian artifact. Osseous fragments were also encountered within SIHP #-2918 Feature 24 (unidentified non-human species) and SIHP #-2918 Feature 26 (dog). Additional faunal remains were encountered in the fill (Stratum Id), the former A-horizon (Stratum II), and Jaucas sand (III). Stratum Id contained butchered cow and pig bones. The osseous remains from Stratum II (A-horizon) were identified as originating from goat, dog, fish, and an unidentified species not consistent with human. Stratum III (Jaucas sand) contained remains from a pig and an unidentified species not consistent with human. Most of the fragmented faunal material likely represents food remains. The cultural content of the buried A-horizon and the presence of SIHP #-2918 Features 22–26 support the utilization of the former land surface (Stratum II) as a pre- to post-Contact human activity area. The buried A-horizon (II), Features 22–26, and the infant burial (Feature 27) were designated as components of SIHP #-2918, which was also identified within T-226A, T-226B, T-226C, T-226D, and T-227 (see Volume I).

T-227A general location, view to the north

T-227A southeast wall, view to the south

T-227A northwest wall, view to the west



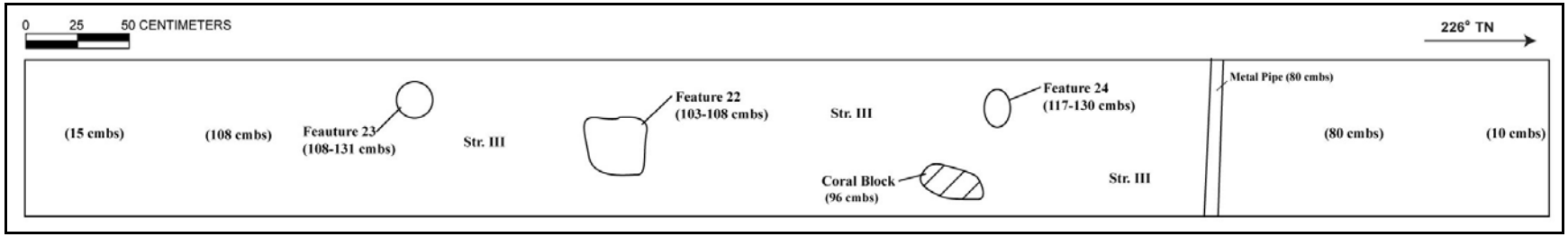
Plan view of SIHP #-2918 Feature 22 in T-227A

Plan view of SIHP #-2918 Feature 23 near northern end of T-227A

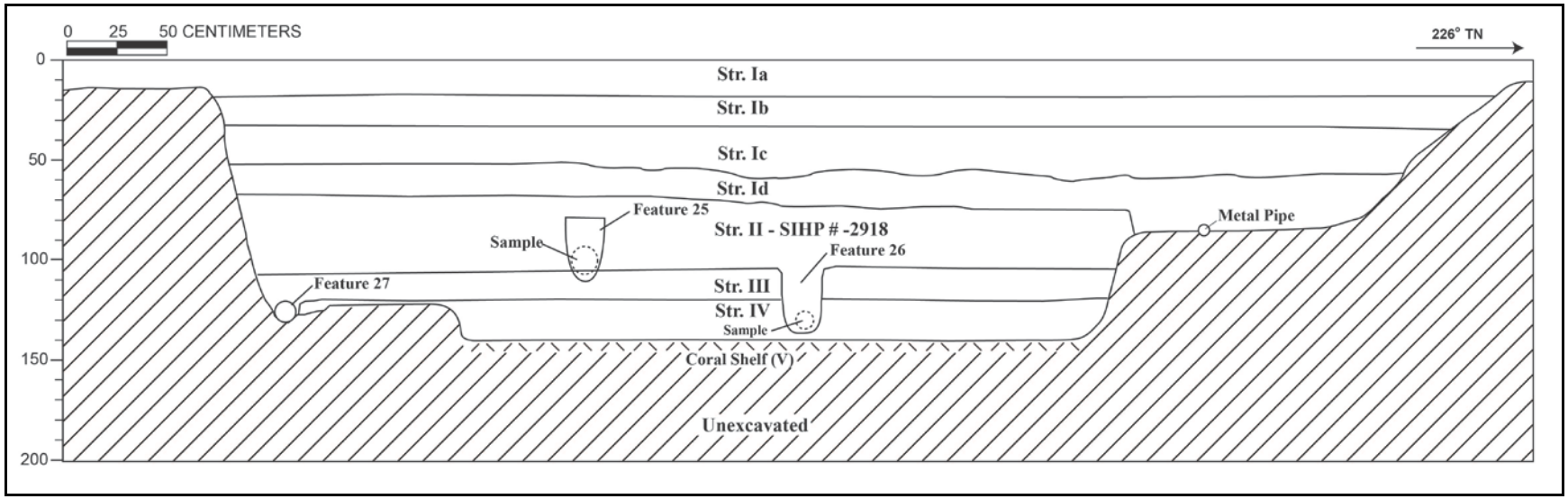
Plan view of SIHP #-2918 Feature 24 in T-227A, view to the south

SIHP #-2918 Feature 25 in southeast profile of T-227A, view to the southeast

SIHP #-2918 Feature 26 in southeast profile of T-227A, view to the south



T-227A plan view showing SIHP #-2918 Features 22–24



T-227A southeast wall profile

T-227A Stratigraphic Description

Stratum	Depth (cmbs)	Description
Ia	0–18	Asphalt; road surface
Ib	18–33	Fill; crushed basalt gravel base course
Ic	33–60	Fill; 10 YR 4/2 (dark grayish brown) mottled with 5% lenses of 10 YR 8/1 (white); loamy sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, smooth lower boundary
Id	52–75	Fill; 2.5 Y 4/2 (dark grayish brown); silty sand; weak, fine, granular structure; moist, very friable consistency; non-plastic; mixed origin; clear, smooth lower boundary; contained faunal bone, bottle glass fragments, ceramic fragments, and rusted metal (collected)
II	68–108	Natural; A-horizon; 10 YR 4/3 (brown); loamy sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; diffuse, wavy lower boundary; contained fire-cracked rock and abundant marine shell; buried former land surface; component of SIHP #-2918; contained Features 22, 23, 25, and 26
SIHP #-2918 Feature 22	103–108	Pit feature originating within Stratum II; loamy sand; contained marine shell midden, fish bone, fire-cracked rock, and a brick fragment
SIHP #-2918 Feature 23	108–131	Pit feature originating within Stratum II; loamy sand; contained charcoal and marine shell midden
SIHP #-2918 Feature 25	94–108	Pit feature originating within the upper portion of Stratum II; loamy sand; contained fish bone and volcanic glass
SIHP #-2918 Feature 26	112–137	Pit feature originating within Stratum II; loamy sand; contained marine shell midden and faunal bone
III	102–120	Natural; 2.5 Y 7/4 (pale yellow); medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; diffuse, smooth lower boundary; Jaucas sand; component of SIHP #-2918; contained Features 24 and 27
SIHP #-2918 Feature 24	117–130	Pit feature originating within Stratum III; loamy sand; contained marine shell midden, faunal bone, and a shark tooth
SIHP #-2918 Feature 27	120	Burial; sand; partial infant burial at base of Stratum III and extending into Stratum IV; no pit outline visible
IV	120–140	Natural; 2.5 Y 7/2 (light gray); sand with clay; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, smooth lower boundary
V	140 (BOE)	Natural; 10 YR 7/4 (very pale brown); bedrock-limestone; structureless, massive; moist, weakly to strongly cemented; discontinuous consistency; non-plastic; marine origin; lower boundary not observed; Pleistocene coral shelf

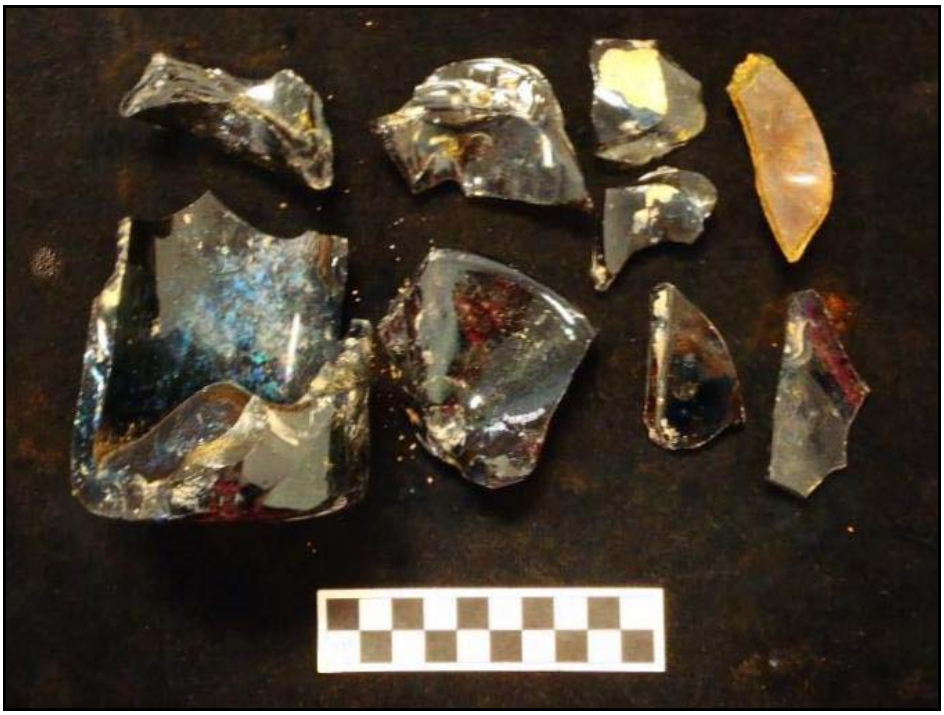
T-227A Historic Artifacts Analysis Table

Acc. #227A-A-	Prov.	Ceramic Vessel Type	Portion	No.	Paste	Origin; Age	Comments
1	T-227A, St. Id	Flatware – large platter	Base	2	Refined earthenware	Euro-American	Whiteware; no decoration
2	T-227A, St. Id	Tableware – unidentified	Body	1	Refined earthenware	Euro-American	Whiteware; pale blue transfer print scenic design, underglaze; impressed maker’s mark on base—illegible
3	T-227A, St. Id	Tableware – serving vessel	Body–rim	1	Refined earthenware	Euro-American	Whiteware; blue floral transfer print, underglaze
Acc. #227A-A-	**Prov.**	**Glass Bottle Type**	**Portion**	**No.**	**Color**	**Origin; Age**	**Comments**
4	T-227A, St. Id	Bottle, beverage	Base	1	Black	pre-1890s	Base: push up
5	T-227A, St. Id	Bottle, gin	Base	1	Olive, dark	pre-1920s	Open pontil case gin
6	T-227A, St. Id	Bottle, beverage	Neck–lip	1	Black	pre-1920	
7	T-227A, St. Id	Bottle	Body	1	Clear	1870s – post	
8	T-227A, St. Id	Bottle	Body	1	Green, light		
9	T-227A, St. Id	Bottle, beverage	Body	3	Olive, dark		
10	T-227A, St. Id	Bottle, beverage	Base	5	Olive, dark	ca. 1860s – post	One piece has letters “AIT;” second piece has unidentifiable letters/design: “…ALTT…KL…”
11	T-227A, St. II, SIHP #-2918	Bottle, spirits	Base	2	Black	pre-1890s	
12	T-227A, St. II, SIHP #-2918	Bottle, spirits	Base	2	Black	pre-1890s	
13	T-227A, St. II, SIHP #-2918	Bottle, spirits	Base	1	Black	pre-1890s	
14	T-227A, St. II, SIHP #-2918	Bottle	Body	1	Olive, dark	1860s – post	Embossed with “…LE” vertically on body
15	T-227A, St. II, SIHP #-2918	Bottle	Body	1	Olive, dark		
16	T-227A, St. II, SIHP #-2918	Bottle	Body	2	Amber		

T-227A Euro-American ceramics, interior; undecorated whiteware (Acc. #227A-A-1; top) and transfer print whitewares (Acc. #s 227A-A-2 and A-3; bottom) from Stratum Id; no decoration on exteriors

T-227A glass bottle fragments (Acc. #s 227A-A-4 through A-10) from Stratum Id

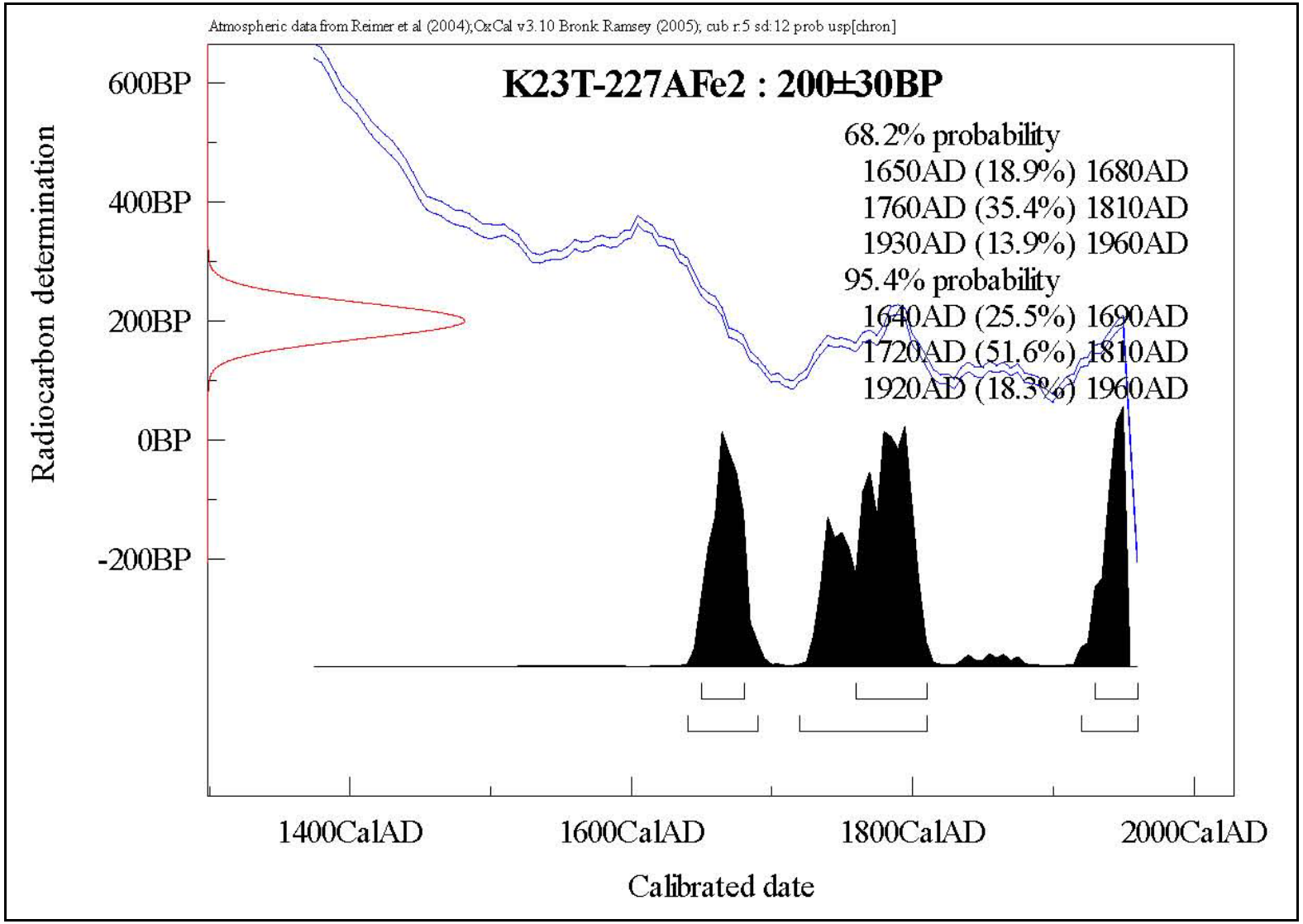
T-227A glass bottle artifacts (Acc. #s 227A-A-4 and A-5) from Stratum Id



T-227A glass bottle fragments (Acc. #s 227A-A-11 through A-16) from Stratum II (SIHP #-2918)

T-227A Faunal Analysis Table

Acc. #	Stratum	Depth (cmbs)	Feature	Family/Class	Species	Element	Description	Modification
227A-F-1	Id	63	–	Bovidae	*Bos taurus* (cow)	Ribs; innominate	Fragments	Butchered (cut with metal blade)
227A-F-2	Id	63	–	Suidae	*Sus scrofa* (pig)	Ulna; diaphysis section; rib; incisors; vertebra; vertebra with facets	Fragments	Diaphysis section butchered (cut with metal blade)
227A-F-3	II SIHP #-2918	68–108	–	Bovidae	*Capra aegagrus hircus* (goat)	Cranial; vertebral facets; proximal phalanx	Fragments	None
227A-F-4	II SIHP #-2918	68–108	–	Mammalia	Medium mammal	Diaphysis sections	Fragments	None
227A-F-5	II SIHP #-2918	80–90	–	Canidae	*Canis lupus familiaris* (dog)	Cranial; molar; canine; vertebral facets; ulna; diaphysis section; metacarpal	Fragments	None
227A-F-6	III	102	–	Suidae	*Sus scrofa* (pig)	Canine	Fragment	None
227A-F-7	III	102	–	Mammalia	Medium mammal	Diaphysis sections	Fragments	None



T-227A SIHP #-2918 Feature 23 (formerly Feature 2) results of radiocarbon analysis

4.14 Test Excavation 227B (T-227B)

***Ahupua‘a*:**	Honolulu
LCA:	7712:6
TMK #:	2-1-027 [Plat]
Elevation Above Sea Level:	1.55 m
UTM:	618017.9387 mE, 2356048.119 mN
Max Length/Width/Depth:	6.74 m/0.79 m/1.45 mbs
Orientation:	144/324° TN
Targeted Project Component	Utility Relocation
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 227B (T-227B) was located in the right lane of westbound Pohukaina Street near the intersection with Punchbowl Street. Existing utilities near T-227B included two gas lines 2.0 m and 7.0 m to the northeast; two water lines parallel with the excavation, 2.1 m and 3.5 m to the southwest; a parallel drain line 4.5 m to the southwest, which crosses the excavation area perpendicularly 2.8 m to the northwest; and a sewer line less than 7.5 m to the southeast. T-227B was located on property owned by the City and County of Honolulu. T-227B was added to further investigate subsurface cultural deposits designated SIHP #50-80-14-2918. This test excavation also investigated a utility relocation. The excavation area was level with the surrounding land surface.

Summary of Background Research and Land Use: Land Court Application 345 Map 1 indicates that T-227B was originally situated on land awarded to V. Kamāmalu as part of LCA 7712/7713. S. E. Bishop’s 1884 map of the Kewalo area of Honolulu indicates that T-227B was located approximately 53 m southeast of the former shoreline, in an undeveloped area less than 20 m west of an unnamed road leading to the “Immigrant Depot” (on present-day Ala Moana Boulevard). In an 1887 map of Honolulu by W. A. Wall, the former unnamed road is labeled Kaka‘ako Street, and the immediate vicinity of T-227B remains undeveloped. According to M. D. Monsarrat’s 1897 map of Honolulu, the location of T-227B was still an undeveloped area, and Kaka‘ako Street intersected and extended from Punchbowl Street. In Newton’s 1904 map of Honolulu, the small street has became an extension of Punchbowl Street, and the location of T-227B was fronting the northeast side of the Honolulu Iron Works in an unnamed Street (Pohukaina), which has remained unchanged in its present-day location.

Two previous archaeology studies have been conducted in the vicinity of T-227B. In 1985, excavations conducted at the former location of the Honolulu Iron Works encountered five human burials in a parcel of land between Punchbowl Street, South Street, Pohukaina Street and Ala Moana Boulevard (Yent 1985). The Department of Land and Natural Resources conducted the fieldwork and identified the burials in a sand deposit within burial pits located beneath approximately 1 m of fill. Although the exact location of the five burials within the study area was not recorded, the report notes the construction site as being at the intersection of Punchbowl Street and Pohukaina Street. The northwestern border of the study area at this intersection is less

than 15 m southwest of T-227B. All five burials were designated SIHP #50-80-14-2918 and were disinterred.

Between 1986 and 1988, CSH conducted archaeological monitoring within the Hawai‘i Community Development Authority's Kaka‘ako Improvement District 1 (ID-1), which included Pohukaina Street and the location of T-227B (Pfeffer et al. 1993). A total of 149 burials were documented and disinterred during archaeological monitoring within ID-1 from four specific burial areas. They consist of Queen Street (116 burials, SIHP #50-80-14-4534), South Street (31 burials, SIHP #50-80-14-3712), Halekauwila Street (1 burial, SIHP #50-80-14-4532), and Punchbowl Street (1 burial, SIHP #50-80-14-4533). The burial identified on Punchbowl Street was located at the King Street intersection, approximately 492 m northeast of T-227B.

Documentation Limitations: T-227B was excavated to the coral shelf at a depth of 1.45 mbs. The water table was encountered at 1.32 mbs. Excavation was limited in the southwestern end of T-227B due to a metal pipe encountered at 0.60 mbs. A combination of backhoe and hand excavation was used to remove the asphalt and upper fill layers (Strata Ia–Id). Hand excavation commenced from the underlying trash fill layer (Stratum Ie) to the coral shelf.

Stratigraphic Summary: The stratigraphy of T-227B consisted of fill overlying natural sediment. Observed strata were asphalt (Ia), gravel base course (Ib), hydraulic sand fill (Ic–Id), and gravelly silty loam fill (Ie), overlying a natural silty clay (II) above the coral shelf (III). Stratum Ie contained abundant cultural material and is interpreted as an imported trash fill layer. The stratigraphy conformed to the USDA soil survey designation of Fill land above Stratum II.

Artifacts Discussion: Nine historic artifacts (Acc. #s 227B-A-1 through A-9, see following table and photographs) were collected from Stratum Ie. These consist of five glass bottles, two ceramics fragments, one metal horseshoe, and one red brick. The bottles were manufactured between 1860 and 1920.

Features Discussion: No features were observed.

Terrestrial Faunal Remains Discussion: Terrestrial faunal remains were collected individually during excavation from Stratum Ie (0.6–1.2 mbs) and consist of *Bos taurus* (cow), *Sus scrofa* (cow; juvenile), and *Gallus gallus* (Red Jungelfowl/chicken) skeletal elements. Neither the *Sus scrofa* nor *Gallus gallus* fragments show any evidence of cultural modification; however, the *Bos taurus* remains were butchered with a metal saw blade, indicating they are historic food remains.

Sample Results: A total of six liters of bulk sediment samples were collected from Stratum II at 1.30–1.40 mbs for analysis of the natural silty clay deposit. The samples were wet screened and yielded naturally-deposited shell material (14.0 g), unidentified wood fragments (0.4 g), and unidentified fish bone (0.1 g). The shell material was classified as *Brachidontes crebristriatus* (7.8 g), Tellinidae (2.3 g), *Tellina palatam* (1.3 g), gastropod fragments (0.6 g), *Natica* spp. (0.5 g), *Echinometra mathaei* sp. (0.3 g), *Hipponix* spp. (0.2 g), *Fragum mundum* (0.1 g), Crustacea (0.1 g), and other Echinoidea/Crustacea/shell fragments (0.8 g). The results of sample analysis support the identification of Stratum II as naturally-deposited shallow marine or estuary sediment.

GPR Discussion: A review of amplitude slice maps indicated no linear features, although a utility was encountered during excavation. Reflectivity was relatively uniform throughout the

grid. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.25 mbs and increases again around 0.75 mbs.

GPR depth profiles for T-227B identified horizontal banding, commonly associated with stratigraphic layering throughout the survey area. This banding corresponds to variations in density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.3 mbs. No utilities or anomalies were observed in the GPR profile, although a utility was encountered during excavation. The maximum depth of clean signal return was approximately 1.25 mbs.

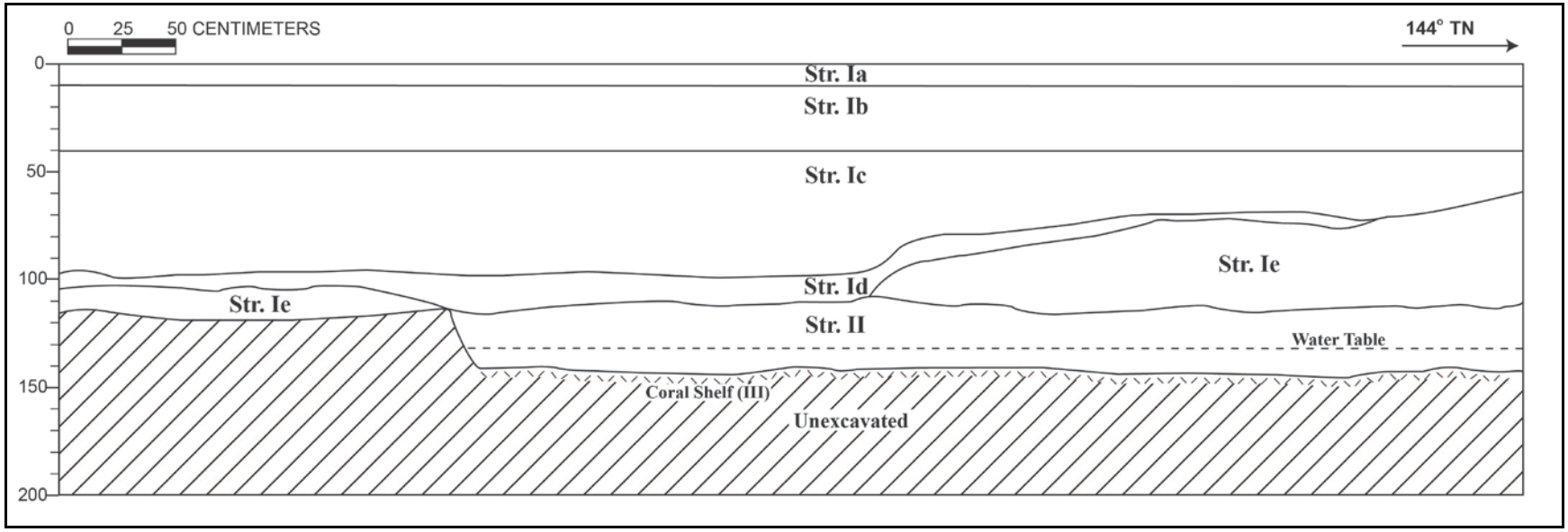
Summary: T-227B was excavated to the coral shelf at a depth of 1.45 mbs. The water table was encountered at 1.32 mbs. The stratigraphy consisted of fill strata (Ia–Ie) overlying natural sediment (II) and the coral shelf (III). The stratigraphy conformed to the USDA soil survey designation of Fill land above Stratum II. Historic artifact analysis of items from Stratum Ie, a trash fill layer, indicated that the collected glass bottles dated form 1860 to 1920. Faunal remains collected from Stratum Ie consisted of cow, Red Junglefowl/chicken, and pig food remains. Sample analysis supported the identification of Stratum II as naturally-deposited shallow marine or estuary sediment. The absence of any natural sediments overlying the buried marine sediments within T-227B indicated that the overlying natural sediments had been previously removed. No archaeological cultural resources were identified within T-227B.

T-227B general location, view to the northwest

T-227B base of excavation showing metal pipe and buffer in west corner, view to the northeast

T-227B southeast wall, view to the south

T-227B northwest wall, view to the west



T-227B northeast wall profile

T-227B Stratigraphic Description

Stratum	Depth (cmbs)	Description
Ia	0–10	Asphalt; road surface
Ib	10–40	Fill; 5 YR 3/3 (dark reddish brown); extremely gravelly loamy sand with about 80% subangular basalt gravel; structureless, single-grain; dry, loose consistency; no cementation; non-plastic; mixed origin; clear, smooth lower boundary; base course fill
Ic	40–99	Fill; 10 YR 8/4 (very pale brown); very fine-grained sand; weak, fine granular structure; moist, very friable consistency; non-plastic; marine origin; very abrupt, smooth lower boundary; land reclamation fill
Id	68–115	Fill; 10 YR 5/1 (gray); very fine-grained silty sand; structureless, massive; moist, very friable consistency; non-plastic; marine origin; abrupt, irregular lower boundary; land reclamation fill
Ie	60–120	Fill; 10 YR 2/3 (very dark brown); gravelly silt loam; moderate, medium, blocky structure; moist, very friable consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; few fine to medium roots; contained metal fragments, wood (not collected), faunal bone, ceramic fragments, glass bottles, a metal horseshoe, and a red brick (collected); imported trash fill
II	107–145	Natural; GLEY 1 5/N (gray); silty clay; structureless, massive; wet, slightly sticky consistency; plastic; abrupt, smooth lower boundary; natural shallow marine or estuary sediment that became more sandy with depth
III	145 (BOE)	Natural; 10 YR 7/4 (very pale brown); bedrock-limestone; structureless, massive; moist, weakly to strongly cemented; discontinuous consistency; non-plastic; marine origin; lower boundary not observed; Pleistocene coral shelf

T-227B Historic Artifacts Analysis Table

Acc. #227B-A-	Prov.	Ceramic Vessel Type	Portion	No.	Paste	Origin; Age	Comments
1	T-227B, St. Ie	Holloware – bowl	Rim–body	1	Refined earthenware	Euro-American	Whitewware; annular slip glaze; wide blue band and narrow red bands above and below
2	T-227B, St. Ie	Flatware – plate	Rim–body	1	Refined earthenware	Euro-American	Whiteware; cut sponge stencil; blue floral design
Acc. #227B-A-	**Prov.**	**Glass Bottle Type**	**Portion**	**No.**	**Color**	**Origin; Age**	**Comments**
3	T-227B, St. Ie	Bottle, spirits	Complete	1	Amber	1881–1905	Embossed on base: “S B & G Co./0,” for Streator Bottle and Glass Co., Streator, Ill.
4	T-227B, St. Ie	Bottle, soda	Complete	1	Aqua	Late 1890s	Embossed vertically on body: “ARCTIC SODA WATER WORKS/M. R. DE SA’ PROP.. / HONOLULU H.I.;” Hutchinson-style closure
5	T-227B, St. Ie	Bottle, spirits	Complete	1	Olive	1900–1920	Date based on beveled champagne lip
6	T-227B, St. Ie	Bottle, medicine	Complete	1	Clear	ca.1860–1899	Embossed vertically on body: “JOHN WYETH & BRO./ PHILADELPHIA”
7	T-227B, St. Ie	Bottle, medicine	Complete	1	Aqua	1880s–1890s	Embossed vertically on sides: “C. I. HOOD & Co/ LOWELL MASS./ APOTHECARIES;” horizontally on body: “HOOD’S/ SARSA/ PARILLA;” on base: “40”
Acc. #227B-A-	**Prove.**	**Miscellaneous Type**	**Portion**	**No.**	**Material**	**Origin; Age**	**Comments**
8	T-227B, St. Ie	Horseshoe	Complete	1	Metal		Rusted metal
9	T-227B, St. Ie	Brick	Complete	1	Fired clay		Red color, machine-made

T-227B ceramic fragments (Acc. #s 227B-A-1 and A-2, left to right) from Stratum Ie

T-227B glass bottles (Acc. #s 227B-A-3 through A-7, left to right) from Stratum Ie

T-227B miscellaneous artifacts (Acc. #s 227B-A-8 and A-9, left to right) from Stratum Ie

4.15 Test Excavation 228 (T-228)

***Ahupua‘a*:**	Honolulu
LCA:	7712:6
TMK #:	N/A
Elevation Above Sea Level:	1.75 m
UTM:	618089.5991 mE, 2355966.028 mN
Max Length/Width/Depth:	6.2 m/0.7 m/1.8 mbs
Orientation:	320/140° TN
Targeted Project Component:	Utility Relocation
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 228 (T-228) is located within the roadcut of Pohukaina Street (property owned by the City and County of Honolulu), bordered by South Street to the east and Punchbowl Street to the west. T-228 is level with the surrounding roadcut surface. The historic shoreline was located 1.7 m southeast of the location of T-228. Utilities surrounding T-228 include a sewage line 3.5 m to the south and a water line 5 m to the south.

Summary of Background Research and Land Use: Background research indicates that in 1884, the location of T-228 was in an undeveloped area, with structures located 100 m to the southwest and the “Immigrant Depot” located 140 m to the south, according to S.E. Bishop’s 1884 map of Honolulu. W. A. Wall’s 1887 map of Honolulu shows T-228 still within an undeveloped area, with three ponds located 150 m to the north. The 1897 map of Honolulu by M. D. Monsarrat indicates large-scale industrial development 200 m to the southwest and three ponds 150 m to the north, with T-228 still located within an undeveloped area. Newton’s 1904 Honolulu map indicates continued industrial development to the southwest, a Honolulu Iron Works structure 11 m *makai*, and disappearance of the ponds to the north, which had been filled in by that time. The 1919 U.S. Army War Department map shows that T-228 was located within the center of a structure, with urban development (structures, grid pattern, and roads) in the immediate vicinity. The 1943 U.S. Army War Department map shows continued heavy urban development, and by 1953 T-228 was located within its modern position inside of the roadcut, according to the 1953 U.S. Army Mapping Service map.

Several previous archaeology studies have been conducted in the vicinity of T-228. In 1985, excavations conducted at the former location of the Honolulu Iron Works encountered five human burials in a parcel of land between Punchbowl Street, South Street, Pohukaina Street, and Ala Moana Boulevard (Yent 1985). The exact location of the five burials within the study area was not recorded, although the report notes the construction site as being at the intersection of Punchbowl Street and Pohukaina Street. The boundary of the study area was located just southwest of T-228. During monitoring for the Judiciary Parking Garage, at the north corner of Pohukaina and South Streets approximately 1.5 m east of T-228, concentrations of historic artifacts (mainly glass bottles; SIHP #50-80-14-1973) were recorded (Athens 1986). Subsequent analysis of the post-Contact artifacts determined that the most likely time frame for the

manufacture and disposal of the historic artifacts was between 1880 and 1930 (Leidemann 1988). A 2011 survey identified four historic properties (SIHP #50-80-14-7124, -7189, -7190 and -7197), including demolition/construction rubble, burned historic debris, salt pan remnants, and a cultural layer containing one late pre-Contact/early post-Contact fire pit feature, approximately 100 m notheast of T-228 (Pammer et al. 2011).

Documentation Limitations: T-228 was excavated to 1.80 mbs. The water table was encountered at 1.60 mbs. There were no factors that limited the excavation or documentation of T-228.

Stratigraphic Summary: The stratigraphy of T-228 consisted of fill strata to the base of excavation at 1.80 mbs. Observed strata were asphalt (Ia), very gravelly sandy loam (Ib), extremely stony to gravelly coarse sand (Ic), gravelly to cobbly sand (Id), and extremely gravelly to stony sand (Ie). The stratigraphy conformed to the USDA soil survey designation of Fill land.

Artifacts Discussion: No artifacts were observed.

Features Discussion: No features were observed.

Terrestrial Faunal Remains Discussion: No terrestrial faunal remains were collected individually during excavation.

Sample Results: No sample analysis was conducted.

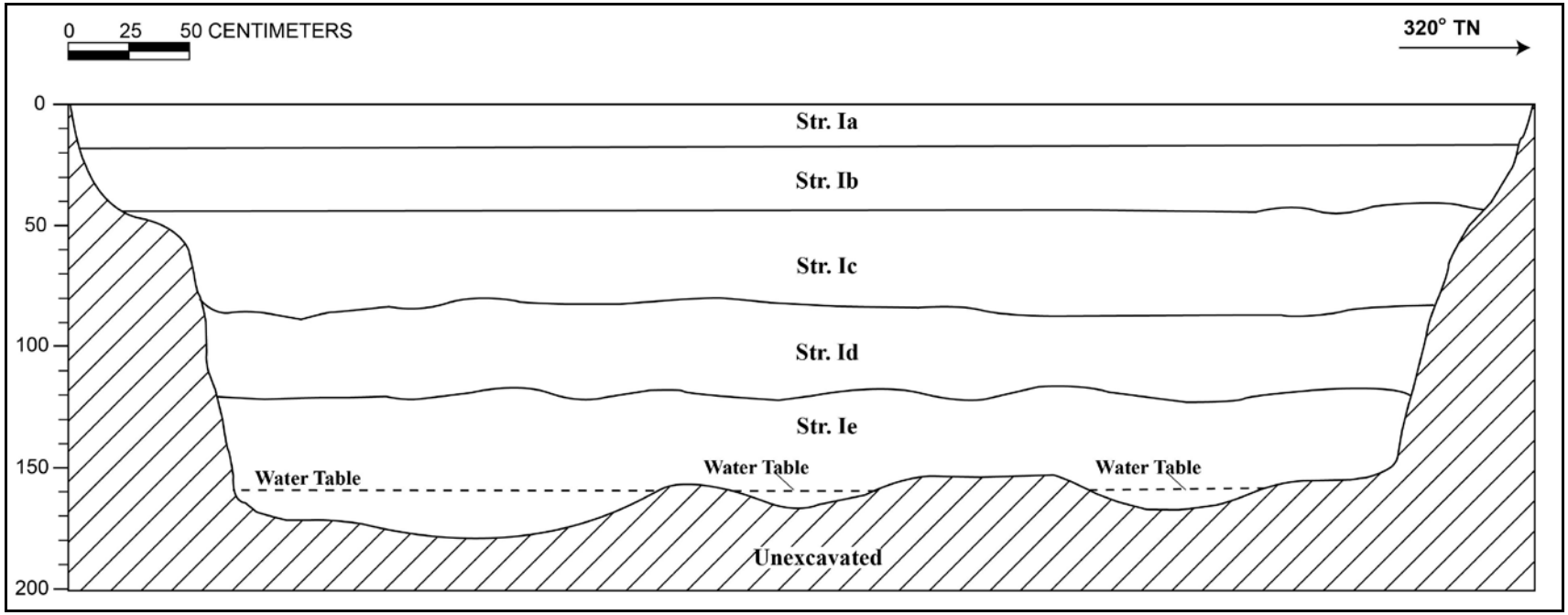
GPR Discussion: A review of amplitude slice maps indicated no linear features that might have indicated the presence of utilities. Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.5 mbs.

GPR depth profiles for T-228 identified horizontal banding, commonly associated with stratigraphic layering throughout the survey area. This banding corresponds to variations in density and chemical composition within fill deposits. The profile also indicated a change in reflectivity occurring around 0.35 mbs. Anomalies were observed in the profile, but not within excavation boundaries. The maximum depth of clean signal return was approximately 1.0 mbs.

Summary: T-228 was excavated to 1.8 mbs. The water table was encountered at 1.60 mbs. The stratigraphy consisted of fill strata (Ia–Ie) to the base of excavation at 1.80 mbs. The stratigraphy conformed to the USDA soil survey designation of Fill land. No archaeological cultural materials were identified within T-228.

T-228 general location, view to the northwest

T-228 southwest profile wall, view to the west



T-228 southwest wall profile

T-228 Stratigraphy Descriptions

Stratum	Depth (cmbs)	Description
Ia	0–18	Asphalt
Ib	18–45	Fill; 5 YR 3/2 (dark reddish brown); very gravelly sandy loam; structureless, single-grain; dry, weakly coherent consistency; non-plastic; terrigenous origin; clear, smooth lower boundary; contained ceramic sherds (not collected); basalt gravel base course
Ic	45–90	Fill; 2.5 Y 6/1 (gray); extremely gravelly to stony coarse sand; structureless, single-grain; dry, loose consistency; non-plastic; marine origin; clear, smooth lower boundary; contained metal fragments/slag, piece of slate (not collected); mostly coral boulders/cobbles/gravels
Id	80–125	Fill; 2.5 Y 4/1 (dark gray) with common very fine mottles of 2.5 Y 6/3 (light yellowish brown); gravelly to cobbly very fine-grained sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; clear, smooth lower boundary; some small coral gravels/cobbles, fill layer; base of excavation cleaned off in this layer to see if pits present—none were; some charcoal flecks, small ceramic fragments, and rusted metal were observed (not collected)
Ie	120–180 (BOE)	Fill; 10 YR 2/1 (black); extremely gravelly to stony coarse-grained sand; structureless, single-grain; wet, non-sticky consistency; non-plastic; terrigenous origin; lower boundary not visible; heavily oxidized decomposed basalt with Tantalus volcanic cinder

4.16 Test Excavation 228A (T-228A)

Ahupua‘a:	Honolulu
LCA:	7712:6
TMK #:	2-1-027 [Plat]
Elevation Above Sea Level:	1.61 m
UTM:	618045.6968 mE, 2356018.978 mN
Max Length/Width/Depth:	6.75 m/0.80 m/1.40 mbs
Orientation:	314/134° TN
Targeted Project Component:	Utility Relocation
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 228A (T-228A) was located on Pohukaina Street, approximately 55 m southeast of the Pohukaina and Punchbowl Streets intersection. T-228A was located 3.4 m southeast of a water line and 5.2 m northwest of a sewer line. T-228A was located on property owned by the City and County of Honolulu. T-228A was added to further investigate natural sand/land surfaces identified in the immediate area. This test excavation also investigated a utility relocation. The excavation surface was level with the surrounding land surface.

Summary of Background Research and Land Use: The land use for this region consisted of taro cultivation, salt production, and fish farming. Most of the LCAs in the vicinity were small awards with house lots, *lo‘i*, and ponds. On S. E. Bishop’s 1884 map of Honolulu, T-228A was located within the *‘ili* of Ka‘ākaukukui in the LCA 7712:6/7713, which was awarded to Victoria Kamāmalu, the sister of Kamehameha IV and Kamehameha V. The 1897 map of Honolulu by M. D. Monsarrat indicates T-228A was situated approximately 200 m southeast of harbors and infrastructure and 150 m south of three ponds. The 1919 U.S. Army War Department Fire Control map indicates major urban development in the areas surrounding T-228A. By 1953, T-228A was located in Pohukaina Street, according to the 1953 U.S. Army Mapping Service map.

Several previous archaeology studies have been conducted in the victinity of T-228A. In 1985, excavations conducted at the former location of the Honolulu Iron Works encountered five human burials in a parcel of land between Punchbowl Street, South Street, Pohukaina Street, and Ala Moana Boulevard (Yent 1985). The exact location of the five burials within the study area was not recorded, although the report notes the construction site as being at the intersection of Punchbowl Street and Pohukaina Street. The boundary of the study area was located within 90 m southwest of T-228A. During monitoring for the Judiciary Parking Garage, at the north corner of Pohukaina and South Streets approximately 120 m east of T-228A, concentrations of historic artifacts (mainly glass bottles; SIHP #50-80-14-1973) were recorded (Athens 1986). Subsequent analysis determined that the most likely time frame for the manufacture and disposal of the historic artifacts was between 1880 and 1930 (Leidemann 1988). A 2011 survey identified four historic properties (SIHP #50-80-14-7124, -7189, -7190 and -7197) consisting of demolition/construction debris, burned historic debris, salt pan remnants, and a cultural layer containing one late pre-Contact/early post-Contact fire pit feature, located approximately 300 m northeast of T-228A (Pammer et al. 2011).

Documentation Limitations: T-228A was excavated to the coral shelf at a depth of 1.40 mbs. There were no factors that limited the documentation of T-228A.

Stratigraphic Summary: The stratigraphy of T-228A consisted of fill material overlying natural sediment. The observed strata were asphalt (Ia), very gravelly sandy loam fill (Ib), very gravelly sandy loam fill (Ic), loamy sand fill (Id), very fine-grained to medium-grained sand fill (Ie), medium-grained to coarse-grained loamy sand fill (If) medium-grained loamy sand fill (Ig), and natural sandy clay (IIa and IIb) overlying the coral shelf (III). The stratigraphy generally conformed to the USDA soil designation of Fill land above Strata IIa and IIb.

Artifacts Discussion: No artifacts were observed.

Features Discussion: No features were observed.

Terrestrial Faunal Remains Discussion: Though not terrestrial, large unidentified fish remains were individually collected from Stratum Ig at 1.25 mbs.

Sample Results: No sample analysis was conducted.

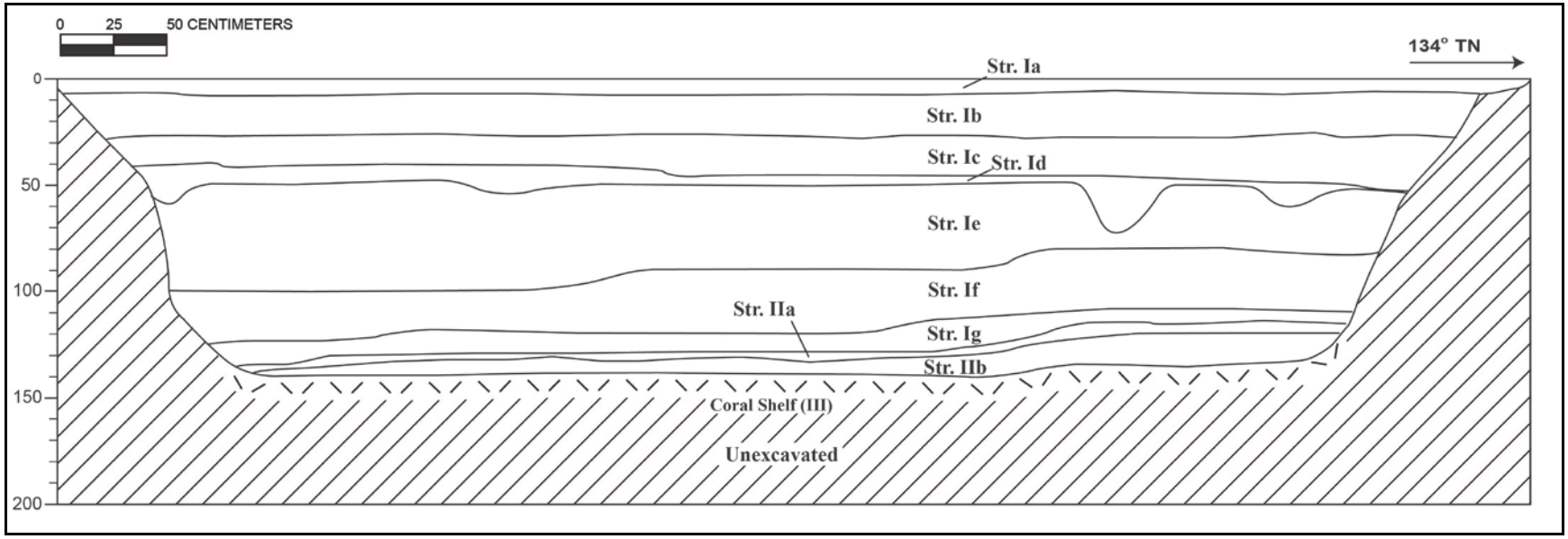
GPR Discussion: A review of amplitude slice maps indicated no linear features that might have indicated the presence of utilities. Reflectivity was relatively uniform throughout the grid. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.25 mbs and increased again around 0.75 mbs.

GPR depth profiles for Excavation 228A identified horizontal banding, commonly associated with stratigraphic layering throughout the survey area. This banding corresponds to variations in density and chemical composition within fill deposits. The profile also indicated a change in reflectivity occurring around 0.15 mbs and again at 0.5 mbs. No utilities were observed in the profile. The maximum depth of clean signal return was approximately 1.3 mbs.

Summary: T-228A was excavated to the coral shelf at a depth of 1.40 mbs. The stratigraphy of T-228A consisted of imported fill material (Ia–If) overlying a locally procured fill event (Ig), which directly overlaid two thin natural marine deposits (IIa and IIb) and the coral shelf (III). The stratigraphy generally conformed to the USDA Fill land soil designation and historical background research, which indicated heavy industrial and urban development over filled-in natural marshlands. No archaeological cultural resources were identified within T-228A.

T-228A general location, view to the south

T-228A northeast profile wall, view to the east



T-228A northeast wall profile

T-228A Stratigraphy Description

Stratum	Depth (cmbs)	Description
Ia	0–8	Asphalt/concrete
Ib	8–29	Fill; 10 YR 3/2 (very dark grayish brown); very gravelly sandy loam; structureless, single-grain; moist, very friable consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; basalt gravel base course
Ic	29–54	Fill; 7.5 YR 3/4 (dark brown); very gravelly sandy loam; structureless, single-grain; moist, very friable consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; basalt gravel base course
Id	40–52	Fill; 10 YR 5/2 (grayish brown); loamy sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, smooth lower boundary; imported sand
Ie	49–100	Fill; 10 YR 7/3 (very pale brown); very fine- to medium-grained sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, smooth lower boundary
If	80–125	Fill; 10 YR 6/2 (light brownish gray); medium- to coarse-grained loamy sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; diffuse, smooth lower boundary; imported fill with striations
Ig	107–135	Fill; 10 YR 6/2 (light brownish gray); medium-grained loamy sand; weak, medium, platy structure; moist, very friable consistency; slightly plastic; marine origin; diffuse, smooth lower boundary; contained faunal bone fragment (collected); imported fill
IIa	115–139	Natural; Gley 2 5/5 BG (greenish clay); sandy clay; moderate, medium, blocky structure; wet, slightly sticky consistency; plastic; marine origin; abrupt, smooth lower boundary
IIb	120–140	Natural; Gley 2 3/5 BG (very dark greenish gray); sandy clay; moderate, medium, blocky structure; wet, slightly sticky consistency; marine origin; abrupt, smooth lower boundary; contained two fragments of wood (not collected)
III	140 (BOE)	Natural; 10 YR 7/4 (very pale brown); bedrock-limestone; structureless, massive; moist, weakly to strongly cemented; discontinuous consistency; non-plastic; marine origin; lower boundary not observed; Pleistocene coral shelf

4.17 Test Excavation 229 (T-229)

***Ahupua‘a*:**	Honolulu
LCA:	7712:6
TMK #:	2-1-030 [Plat]
Elevation Above Sea Level:	1.51 m
UTM:	618187.8925mE, 2355851.085mN
Max Length/Width/Depth:	6.10 m/0.80 m/1.48 mbs
Orientation:	144/334° TN
Targeted Project Component:	Utility Relocation
USDA Soil Designation:	Ewa silty clay loam (EmA)

Setting: Test Excavation 229 (T-229) was located on Pohukaina Street, east of Ala Moana Boulevard and between South Street and Keawe Street. Several utilities were located near T-229 including a storm drain 1.50 m to the northeast, a sewer line 2.14 m to the north, and a water line 6.50 m to the northwest. The test excavation was level with the surrounding road surface and was located on City and County of Honolulu-owned property.

Summary of Background Research and Land Use: The land use for this region consisted of taro cultivation, salt production, and fish farming. Most of the LCAs in the vicinity were small awards with house lots, *lo‘i*, and ponds. On S. E. Bishop’s 1884 map of Honolulu, T-229 was located within the *‘ili* of Ka‘ākaukukui in the LCA 7712:6/7713, which was awarded to Victoria Kamāmalu, the sister of Kamehameha IV and Kamehameha V. The 1919 U.S. Army War Department Fire Control map indicates major urban development in the areas surrounding T-229. By 1953, T-229 was located in Pohukaina Street, according to the 1953 U.S. Army Mapping Service map.

Several previous archaeology studies have been conducted in the vicinity of T-229. In 1985, excavations conducted at the former location of the Honolulu Iron Works encountered five human burials in a parcel of land between Punchbowl Street, South Street, Pohukaina Street, and Ala Moana Boulevard (Yent 1985). The exact location of the five burials within the study area was not recorded, although the report notes the construction site as being at the intersection of Punchbowl Street and Pohukaina Street. The boundary of the study area was located within 140 m southwest of T-229. During monitoring for the Judiciary Parking Garage, at the north corner of Pohukaina and South Streets, approximately 70 m northwest of T-229, concentrations of historic artifacts (mainly glass bottles; SIHP #50-80-14-1973) were recorded (Athens 1986). Subsequent analysis determined that the most likely time frame for the manufacture and disposal of the historic artifacts was between 1880 and 1930 (Leidemann 1988). A 2011 survey identified four historic properties (SIHP #50-80-14-7124, -7189, -7190 and -7197) consisting of construction/demolition debris, burned historic debris, salt pan remnants, and a cultural layer containing one late pre-Contact/early post-Contact fire pit feature approximately 11 m north of T-229 (Pammer et al. 2011).

Documentation Limitations: T-229 was excavated to the coral shelf at 1.48 mbs. There were no factors that limited the documentation of T-229.

Stratigraphic Summary: The stratigraphy of T-229 consisted of fill strata overlying natural sediment to the base of excavation at the coral shelf. Observed strata were asphalt (Ia), basalt gravel base course fill (Ib), gravelly sandy loam fill (Ic), burned fill (Id), sandy clay loam fill (Ie), sandy silt with cobble inclusions (If), sandy clay fill (Ig and Ih), natural sandy clay (II), and the decomposing coral shelf (III) overlying the coral shelf (IV). The sediment deposition was composed of eight imported fill events overlying two natural marine deposits, which were directly above the coral shelf. The stratigraphy does not conform to the USDA soil survey designation of Ewa silty clay loam, but instead was more consistent with sediments seen in the Fill land soil designation. Stratum II was considered to be a component of SIHP #50-80-14-7190, buried salt pan remnants.

Artifacts Discussion: No artifacts were collected.

Features Discussion: No features were observed.

Terrestrial Faunal Remains Discussion: No terrestrial faunal remains were collected individually during excavation.

Sample Results: One bulk sediment sample was collected from Stratum II (SIHP #7190) between 1.19 and 1.31 mbs (2.5 L). The sample was wet screened and yielded charcoal (0.7 g); naturally-deposited shell, including *Melampus castaneus* (3.2 g), *Brachiodontes crebristriatus* (2.7 g), Crustacea (0.1 g), *Nerita picea* (0.4 g), *Trochus* sp. (0.8 g), Fasciolariidae (0.8 g), *Echinometra mathaei* sp. (0.1 g), *Natica* sp. (0.5 g), gastropods (0.5 g), and a fish scale (0.1 g). The results of sample analysis indicate that Stratum II (SIHP #7190) contains a very sparse amount of organic content.

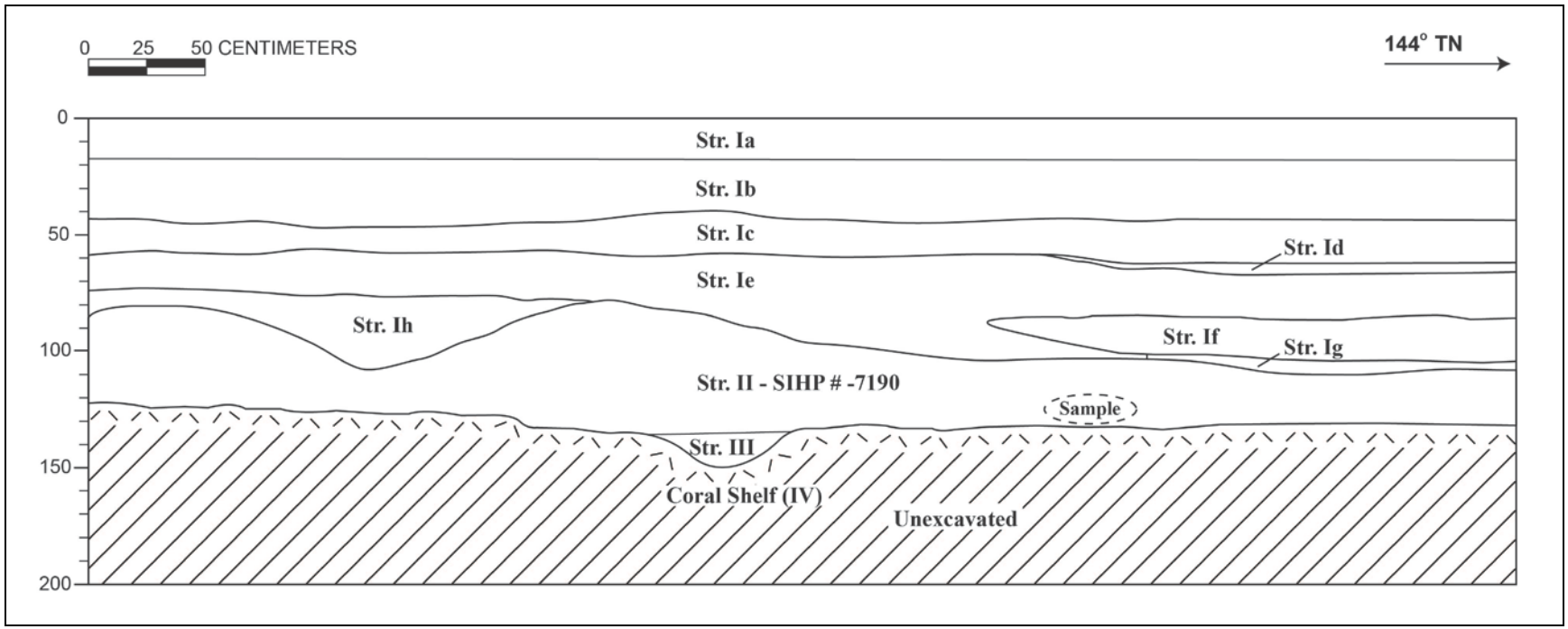
GPR Discussion: A review of amplitude slice maps indicated no linear features that might have indicated the presence of utilities. Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.5 mbs.

GPR depth profiles for T-229 identified horizontal banding, commonly associated with stratigraphic layering throughout the survey area. This banding corresponds to variations in density and chemical composition within fill deposits. The profile also indicated a change in reflectivity occurring around 0.25 mbs. No utilities were observed in the profile. The maximum depth of clean signal return was approximately 1.0 mbs.

Summary: T-229 was excavated to the coral shelf at 1.48 mbs. Sediment deposition was composed of eight imported fill events (Ia–Ih), overlying natural marine sediment (II), which was directly above naturally decomposing coral shelf (III) and the coral shelf (IV). Sample analysis indicated that Stratum II contained a very sparse amount of organic content. The undulating Stratum II was considered to represent a possible sand berm and was designated as a component of SIHP #-50-80-14-7190, buried salt pan remnants (see Volume I).

T-229 general location, view to the northwest

T-229 northeast profile wall, view to the east



T-229 northeast wall profile

T-229 Stratigraphic Description

Stra-tum	Depth (cmbs)	Description
Ia	0–17	Asphalt
Ib	17–47	Fill; 10 YR 4/2 (dark grayish brown); extremely gravelly loam; structureless, single-grain; moist, loose consistency; non-plastic, terrigenous origin; abrupt, smooth lower boundary; gravel base course
Ic	40–63	Fill; 10 YR 3/1 (very dark gray); gravelly sandy loam; structureless, single-grain; moist, very friable consistency; non-plastic; mixed origin; clear, smooth lower boundary; contained charcoal, glass and ceramic fragments, and red brick (not collected); coral and basalt gravel and cobble inclusions
Id	63–68	Fill; 10 YR 2/1 (black); silty sandy loam, structureless, single-grain; moist, very friable consistency; non-plastic; terrigenous origin; burned fill; abrupt, broken/discontinuous lower boundary
Ie	60–104	Fill; 10 YR 3/3 (dark brown); sandy clay loam; weak, fine, blocky structure; friable consistency; slightly plastic; mixed origin; clear, wavy lower boundary; contained red brick (not collected); contained small coral boulders, cobbles, and gravel
If	85–105	Fill; 10 YR 5/6 (yellowish brown) with common small mottles of 10 YR 3/3 (dark brown); extremely cobbly to stony sandy silt; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; clear, smooth lower boundary; contained coral cobbles and small boulders, red brick, glass and ceramic fragments (not collected)
Ig	100-110	Fill; GLEY 1 3/5 GY (very dark greenish gray); sandy clay; structureless, massive; wet, slightly sticky consistency; plastic; terrigenous origin; clear, wavy lower boundary
Ih	73–107	Fill; 2.5 Y 4/3 (olive brown) with common very coarse mottles of 7.5 YR 8/2 (pinkish white), few coarse mottles of GLEY 1 3/2 (very dark grayish green), and few coarse mottles of 5 YR 4/6 (yellowish red); sandy clay; moderate, medium, blocky structure; wet, slightly stick consistency; plastic; mixed origin; abrupt, irregular lower boundary; contained burned wood, two pieces of metal pipe (not collected); fill surrounding old pipe containing coral cobbles and boulders; GPR readout showed old excavation, likely for pipe
II	78–135	Natural; 2.5 Y 6/2 (light grayish brown) with mottles of GLEY 1 6/5 GY (greenish gray); sandy clay; structureless, massive; moist, firm consistency; plastic; marine origin; clear, smooth lower boundary; possible sand berm, with organic (roots) inclusions; component of SIHP #-7190
III	125–148 (BOE)	Natural; C-horizon; 2.5 Y 6/2 (light grayish brown); decomposing coral shelf; structureless, massive; indurated consistency; non-plastic; marine origin; lower boundary not visible
IV	135–148 (BOE)	Natural; 10 YR 7/4 (very pale brown); bedrock-limestone; structureless, massive; moist, weakly to strongly cemented; discontinuous consistency; non-plastic; marine origin; lower boundary not observed; Pleistocene coral shelf

4.18 Test Excavation 230 (T-230)

***Ahupua‘a*:**	Honolulu
LCA:	7712:6
TMK #:	2-1-030 [Plat]
Elevation Above Sea Level:	1.56 m
UTM:	618261.1544mE, 2355761.85mN
Max Length/Width/Depth:	6.00 m/0.80 m/1.55 mbs
Orientation:	144/324° TN
Targeted Project Component:	Utility Relocation
USDA Soil Designation:	Fill land (FL) and Ewa silty clay loam (EmA)

Setting: Test Excavation 230 (T-230) was located on the southwest side of Pohukaina Street near the Keawe Street intersection. T-230 was located on property owned by the City and County of Honolulu near the historic Mother Waldron Park (SIHP #50-80-14-1388). Utilities near T-230 included a drain line 1.3 m to the northeast and a sewer line 2.7 m to the southwest. The excavation surface was level with the surrounding surface.

Summary of Background Research and Land Use: The land use for this region consisted of taro cultivation, salt production, and fish farming. Most of the LCAs in the vicinity were small awards with house lots, *lo‘i*, and ponds. On S. E. Bishop’s 1884 map of Honolulu, T-230 was located within the *‘ili* of Ka‘ākaukukui in the LCA 7712:6/7713, which was awarded to Victoria Kamāmalu, the sister of Kamehameha IV and Kamehameha V. Baldwin’s 1883 map of Honolulu places T-230 330 m northeast of the former shoreline. T-230 was within former marshlands that extended across the Kaka‘ako coastal zone, according to S.E. Bishop’s 1884 map of Honolulu. W. A. Wall’s 1887 map of Honolulu indicates that T-230 was still within an undeveloped area, with sparse urban development to the north. M. D. Monsarrat’s 1897 map of Honolulu shows a changing landscape, with increased urban development and street grids to the north. By 1919, the coastal marshlands were filled and replaced with industrial structures and urban development, according to the 1919 U.S. Army War Department Fire Control map. Urban development continued through the 1950s, with major shoreline extension starting in 1933, according to the 1933 and 1943 U.S. Army War Department maps. By 1953, T-230 was located within a heavily urbanized area adjacent to Mother Waldron Park (SIHP #50-80-14-1388), according to the 1953 U.S. Army Mapping Service topographic map.

Several archaeological studies have been conducted in the vicinity of T-230. A historic burned trash layer (SIHP #50-80-14-7189) and a salt pan layer (SIHP #50-80-14-7190) were identified approximately 41 m west of T-230 (Pammer et al. 2011). A post-Contact subsurface deposit (SIHP #-1388) was identified approximately 20 m northwest of T-230 (Hammatt 1998). Eleven burials (SIHP #50-80-14-5820) around Mother Waldron Park were identified during archaeological monitoring of a study area located approximately 200 m north of T-230 (Douglas 1991; Winieski and Hammatt 2000).

Documentation Limitations: T-230 was excavated to the coral shelf at 1.55 mbs. No factors limited documentation.

Stratigraphic Summary: Stratigraphy consisted of fill layers overlying natural sediments. The observed strata were asphalt (Ia), extremely gravelly loam base course fill (Ib), crushed coral fill (Ic), clay hydraulic fill (Id), gravelly sandy loam fill (Ie), natural marsh/wetland clay with peat lenses (II), natural marine sand (III), the decomposing coral shelf (IV), overlying the coral shelf (V). T-230 was located on the USDA soil survey boundary between Fill land (FL) and Ewa silty clay loam (EmA). The stratigraphy generally conformed to the USDA soil survey designation of Fill land above Strata II–IV.

Artifacts Discussion: No artifacts were collected.

Features Discussion: No features were observed.

Terrestrial Faunal Remains Discussion: No terrestrial faunal remains were collected individually during excavation.

Sample Results: A bulk sediment sample was collected from Stratum II at 1.2–1.4 mbs (4 L). The bulk sample was wet screened and yielded charcoal (0.3 g), naturally-deposited marine shell (3.5 g), and *Ruppia maritima* seeds (0.3 g). The results of sample analysis support the identification of Stratum II as naturally-deposited wetland sediment.

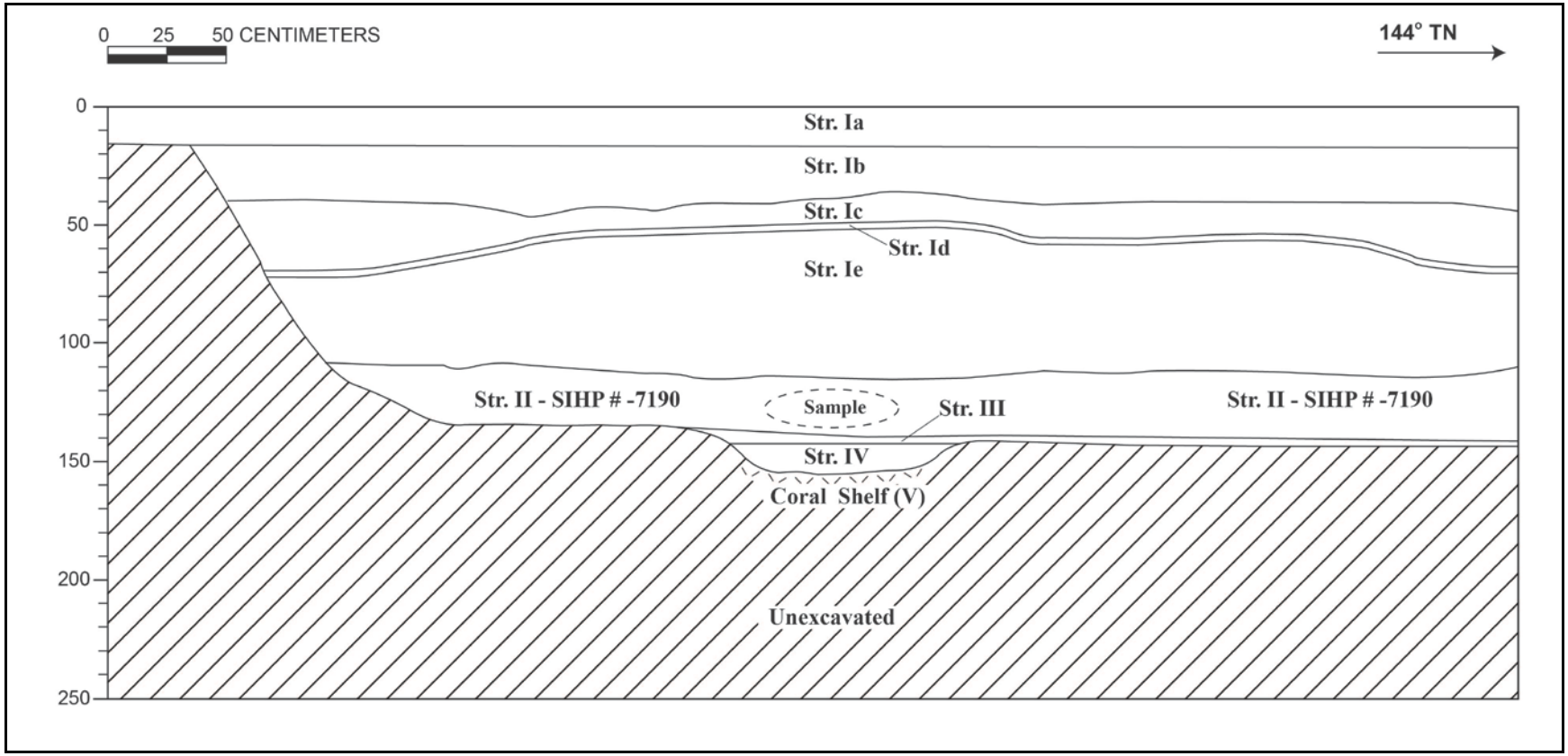
GPR Discussion: A review of amplitude slice maps indicated no linear features that might have indicated the presence of utilities. Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.25 mbs.

GPR depth profiles for T-230 identified horizontal banding, commonly associated with stratigraphic layering throughout the survey area. This banding corresponds to variations in density and chemical composition within fill deposits. The profile also indicated a change in reflectivity occurring around 0.1 mbs. No utilities were observed in the profile. The maximum depth of clean signal return was approximately 1.0 mbs.

Summary: T-230 was excavated to the coral shelf at 1.55 mbs. Stratigraphy consisted of fill strata (Ia–Ie) overlying natural sediments (II–III) and the decomposing coral shelf (IV) overlying the hard coral shelf (V). The stratigraphy generally conformed to the USDA soil survey designation of Fill land and not to Ewa silty clay loam. Stratum II consisted of clay with thick lenses of peat and contained charcoal, roots, and *Ruppia maritima* seeds. Pammer et al. (2011) documented very similar salt pan sediments approximately 41 m west of T-230. Stratum II has been designated as a component of SIHP #50-80-14-7190, buried salt pan remnants (see Volume I).

T-230 general location, view to the northwest

T-230 northeast profile wall, view to the northeast



T-230 northeast wall profile

T-230 Stratigraphic Description

Stratum	Depth (cmbs)	Description
Ia	0–16	Asphalt
Ib	16–46	Fill; 10 YR 5/1 (gray); extremely gravelly loam; structureless, single-grain; moist, loose consistency; non-plastic, terrigenous origin; abrupt, smooth lower boundary; gravel base course
Ic	37–70	Fill; 10 YR 6/2 (light brownish gray), extremely gravelly sand; structureless, single-grain; moist, loose consistence; non-plastic; marine origin; abrupt, smooth lower boundary; crushed coral fill
Id	47–70	Fill; 10 YR 7/2 (light gray); clay; structureless, massive; moist, friable consistency; plastic; marine origin; abrupt, smooth lower boundary; hydraulic fill and clay lens
Ie	50–115	Fill; 10 YR 5/2 (grayish brown); extremely gravelly sand; structureless, single-grain; moist, loose consistency; slightly plastic; mixed origin; abrupt lower boundary; crushed coral basalt fill with faunal remains (one piece collected)
II	110–137	Natural; GLEY 1 6/N (gray); silty clay; weak, very fine to blocky structure; moist, friable consistency; plastic; mixed origin; clear, lower boundary; common, fine roots; low energy marshland sediments; contained darker lenses of peat; salt pan remnant deposit; component of SIHP #-7190
III	135–145	Natural; 10 YR 7/2 (light gray); sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; clear, smooth lower boundary
IV	145–155	Natural; 10 YR 7/4 (very pale brown); bedrock-limestone; structureless, massive; moist, weakly to strongly cemented; discontinuous consistency; non-plastic; marine origin; decomposing Pleistocene coral shelf
V	155 (BOE)	Natural; 10 YR 7/4 (very pale brown); bedrock-limestone; structureless, massive; moist, weakly to strongly cemented; discontinuous consistency; non-plastic; marine origin; lower boundary not observed; Pleistocene coral shelf

4.19 Test Excavation 231 (T-231)

***Ahupua‘a*:**	Honolulu
LCA:	7712:6
TMK #:	2-1-051 [Plat]
Elevation Above Sea Level:	1.84 m
UTM:	618349.5526 mE, 2355646.177 mN
Max Length/Width/Depth:	6.00 m/0.80 m/1.32 mbs
Orientation:	316/136° TN
Targeted Project Component:	Utility Relocation (electrical manhole)
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 231 (T-231) was located in the southwest side of Pohukaina Street near the Cooke Street intersection. T-231 was located on property owned by the City and County of Honolulu near the southern side of the historic Mother Waldron Park (SIHP #50-80-14-1388). Utilities located within the proximity of T-231 included a water line 4 m to the northeast and a Hawaiian Telcom line 0.9 m to the southwest. The excavation surface was level with the surrounding surface.

Summary of Background Research and Land Use: The land use for this region consisted of taro cultivation, salt production, and fish farming. Most of the LCAs in the vicinity were small awards with house lots, *lo‘i*, and ponds. On S. E. Bishop’s 1884 map of Honolulu, T-231 was located within the *‘ili* of Ka‘ākaukukui in the LCA 7712:6/7713, which was awarded to Victoria Kamāmalu, the sister of Kamehameha IV and Kamehameha V. Baldwin’s 1883 map of Honolulu placs T-231 320 m northeast of the former shoreline. T-231 was within former marshlands that extended across the Kaka‘ako coastal zone, according to S.E. Bishop’s 1884 map of Honolulu. W. A. Wall’s 1887 map of Honolulu indicates that T-231 was still within an undeveloped area, with sparse urban development to the northeast. M. D. Monsarrat’s 1897 map of Honolulu showed a changing landscape, with increased urban development and street grids to the northeast. By 1919, the coastal marshlands were filled and replaced with industrial structures and urban development, according to the 1919 U.S. Army War Department Fire Control map. Urban development continued through the 1950s according to the 1933 and 1943 U.S. Army War Department maps. By 1953, T-231 was within a heavily urbanized area adjacent to Mother Waldron Park (SIHP #-1388), according to the 1953 U.S. Army Mapping Service topographic map.

Several previous archaeological studies have been conducted in the vicinity of T-231. A historic burned trash layer (SIHP #50-80-14-7189) and a salt pan layer (SIHP #50-80-14-7190) were identified approximately 190 m west of T-231 (Pammer et al. 2011). A post-Contact subsurface deposit (SIHP #-1388; Mother Waldron Park) was identified approximately 15 m west of T-231 (Hammatt 1998). Eleven burials (SIHP #50-80-14-5820) around Mother Waldron Park (SIHP #-1388) were identified during archaeological monitoring of a study area located approximately 130 m north of T-231 (Douglas 1991; Winieski and Hammatt 2000).

Documentation Limitations: T-231 was excavated to a depth of 1.32 mbs. Excavation was limited by the presence of a 12-inch vitrified clay pipe encountered at 1.30 mbs that extended the length of the excavation. Excavation was unable to proceed below the utility.

Stratigraphic Summary: The stratigraphy of T-231 consisted of fill material to the base of excavation. The observed strata were asphalt (Ia), gravel base course (Ib), crushed coral fill (Ic), silty sand fill (Id), and sand fill (Ie). The stratigraphy conformed to the USDA soil survey designation of Fill land.

Artifacts Discussion: No artifacts were observed.

Features Discussion: No features were observed.

Terrestrial Faunal Remains Discussion: No terrestrial faunal remains were collected individually during excavation.

Sample Results: No sample analysis was performed.

GPR Discussion: A review of amplitude slice maps indicated a linear feature, which could correspond to the sewer line that was encountered during excavation. Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.25 mbs.

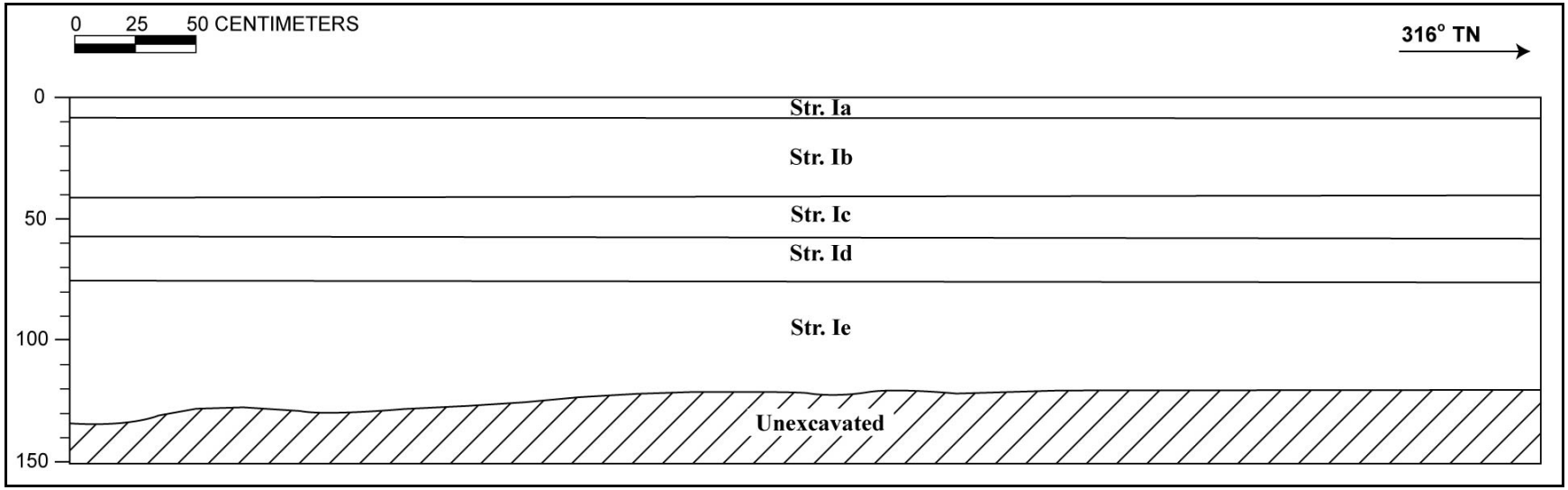
GPR depth profiles for Excavation 231 identified horizontal banding, commonly associated with stratigraphic layering throughout the survey area. This banding corresponds to variations in density and chemical composition within fill deposits. The profile also indicated a change in reflectivity occurring around 0.2 mbs and again around 0.7 mbs. An anomaly was observed in the profile and seemed to correspond to the sewer line encountered during excavation. The maximum depth of clean signal return was approximately 1.5 mbs.

Summary: T-231 was excavated to a depth of 1.32 mbs. A 12-inch vitrified clay pipe at 1.30 mbs prevented further excavation. The stratigraphy conformed to the USDA soil survey designation of Fill land. No natural sediments were observed. No archaeological cultural materials were identified within T-231.

T-231 general location, view to the northwest

T-231 southwest profile wall, view to the west

T-231 general view of the exposed portion of vitrified clay pipe at the base of excavation



T-231 southwest wall profile

T-231 Stratigraphic Description

Stratum	Depth (cmbs)	Description
Ia	0–9	Asphalt
Ib	9–43	Fill; 10 YR 5/1 (gray); extremely gravelly loam; structureless, single-grain; moist, loose consistency; non-plastic, terrigenous origin; abrupt, smooth lower boundary; gravel base course
Ic	43–58	Fill; 10 YR 8/3 (very pale brown); extremely gravelly sand; structureless, single-grain; moist, loose consistency; non-plastic; diffuse, smooth lower boundary; contained chunks of buried asphalt slab, old broken pipe pieces; imported crushed coral fill with construction and modern debris
Id	58–76	Fill; 10 YR 8/2 (very pale brown); silty sand; structureless, massive; moist, friable consistency; slightly plastic; mixed origin; clear, smooth lower boundary; imported hydraulic fill—thin bands (3–4 cm) of 10 YR 7/2 hydraulic fill clay
Ie	76–132 (BOE)	Fill; 10 YR 7/4 (very pale brown); sand; structureless, single-grain; moist, very friable consistency; non-plastic; marine origin; contained asphalt chunks, 12” vitrified clay pipe; imported sand fill with gravel

4.20 Test Excavation 231A (T-231A)

***Ahupua‘a*:**	Honolulu
LCA:	7712:6
TMK #:	2-1-051 [Plat]
Elevation Above Sea Level:	1.85 m
UTM:	618355.9617mE, 2355651.928mN
Max Length/Width/Depth:	6.71 m/0.71 m/1.85 mbs
Orientation:	128/308° TN
Targeted Project Component:	Utility Relocation
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 231A (T-231A) was located within Pohukaina Street near the Cooke Street intersection. T-231A was located on property owned by the City and County of Honolulu near the southern side of the historic Mother Waldron Park (SIHP #50-80-14-1388). Utilities near T-231A included electrical lines 2.7 m to the northeast and 3.0 m to the west and a sewer line 4.2 m to the west. T-231A was added to further investigate the vicinity of T-231, which encountered a utility line and could not be completely excavated. This test excavation also investigated a utility relocation. The excavation surface was level with the surrounding land surface.

Summary of Background Research and Land Use: The land use for this region consisted of taro cultivation, salt production, and fish farming. Most of the LCAs in the vicinity were small awards with house lots, *lo‘i*, and ponds. According to S. E. Bishop’s 1884 map of Honolulu, T-231A was located within the *‘ili* of Ka‘ākaukukui in the LCA 7712:6/7713, which was awarded to Victoria Kamāmalu, the sister of Kamehameha IV and Kamehameha V. Baldwin’s 1883 map of Honolulu places T-231A 330 m northeast of the former shoreline. T-231A was within former marshlands that extended across the Kaka‘ako coastal zone, according to S. E. Bishop’s 1884 map of Honolulu. W. A. Wall’s 1887 map of Honolulu indicates that T-231A was still within an undeveloped aream, with sparse urban development to the northeast. M. D. Monsarrat’s 1897 map of Honolulu shows a changing landscape, with increased urban development and street grids to the northeast. By 1919, the coastal marshlands were filled and replaced with industrial structures and urban development, according to the 1919 U.S. Army War Department Fire Control map. Urban development continued through the 1950s, with major shoreline extension starting in 1933, according to the 1933 and 1943 U.S. Army War Department maps. By 1953, T-231A was within a heavily urbanized area adjacent to Mother Waldron Park (SIHP #50-80-14-1388), according to the 1953 U.S. Army Mapping Service topographic map.

Several previous archaeological studies had been conducted in the vicinity of T-231A. A historic burned trash layer (SIHP #50-80-14-7189) and a salt pan layer (SIHP #50-80-14-7190) were identified approximately 200 m west of T-231A (Pammer et al. 2011). A post-Contact subsurface deposit (SIHP #-1388; Mother Waldron Park) was identified approximately 5 m west of T-231A (Hammatt 1998). Eleven burials (SIHP #50-80-14-5820) around Mother Waldron

Park (SIHP #-1388) were identified during archaeological monitoring of a study area located approximately 120 m north of T-231A (Douglas 1991; Winieski and Hammatt 2000).

Documentation Limitations: T-231A was excavated to a depth of 1.85 mbs. The water table was encountered at 1.83 mbs. A utility was encountered at 0.53 mbs in the north wall and extended the length of T-231A. Excavation proceeded with a smaller backhoe bucket.

Stratigraphic Summary: The stratigraphy of T-231A consisted of fill material overlying natural sediments. The observed strata were asphalt (Ia), very gravelly silty sand fill (Ib), very gravelly sandy loam fill (Ic), silt loam fill (Id), gravelly sandy loam fill (Ie), sandy loam fill (If), a burned trash layer (Ig), silty clay loam fill (Ih), natural silty sand (II), very gravelly to cobbly loamy sand (III), and the decomposing coral shelf (IV). The stratigraphy conformed to the USDA soil survey designation of Fill land above Strata II–IV. Stratum Ig was considered to be a component of SIHP #-7189, a subsurface historic burned trash layer.

Artifacts Discussion: A total of 31 items/fragments representing 22 artifacts (Acc. #s 231A-A-1 through A-22, see following table and photographs) were collected from Stratum Ig between 0.90 and 1.32 mbs. The artifacts consist of 10 ceramic fragments from six vessels, nine glass fragments from nine bottles, and 12 miscellaneous artifact fragments. One ceramic saucer made in England (Acc. #231A-A-1) was dated to 1873 to 1907. Other ceramics included a Chinese porcelain “Bamboo” motif bowl and Chinese stoneware jar fragments. The glass bottles are all mold blown, dating from the 1860s to the 1890s; one bottle (Acc. #231A-A-14) denotes a former downtown drugstore, Hollister and Co. One miscellaneous artifact, a box lid (Acc. #231A-A-16), possibly for sealing paste, has an Asian design. Artifacts collected from T-231A date from the mid-nineteenth century to the early twenthieth century. A chert manuport was also collected from Stratum Ic at 0.54 mbs.

Features Discussion: No features were observed.

Terrestrial Faunal Remains Discussion: Faunal fragments from *Bos taurus* (cow) and *Sus scrofa* (pig) were collected from Stratum Ic at approximately 0.54 mbs (see Faunal Analysis Table below). The faunal remains were considered to be food remnants.

Sample Results: Bulk sediment samples were collected from Stratum Ig (SIHP #-7189) at 0.90–1.10 mbs (15 L), Stratum III at 1.50–1.68 mbs (2 L), and Stratum IV at 1.68–1.85 mbs (2 L). All of the bulk sediment samples were wet screened. The bulk sample from Stratum Ig contained charcoal (0.6 g), naturally-occurring, water-rounded marine shell (1.7 g), unidentified medium mammal bones cut with a metal saw blade (5.9 g), other unidentified medium mammal bones (0.5 g), an unidentified small mammal bone (0.1 g), unidentified fish bone (0.2 g), and numerous historic artifacts. The historic artifacts from the Stratum Ig (SIHP #-7189) sample consist of rusted metal fragments (91.6 g), bottle glass fragments (31.3 g), ceramic fragments (10.9 g), a porcelain fragment (0.1 g), coal or slag pieces (7.1 g), a rusted 22-caliber copper shell casing (0.7 g), and small metal nails (0.2 g). The bulk samples from Stratum III and Stratum IV yielded only naturally-occurring, water-rounded marine shell consistent with a shallow marine or estuary environment.

GPR Discussion: A review of amplitude slice maps indicated no linear features, although two utilities were encountered during excavation. Reflectivity was relatively uniform throughout the

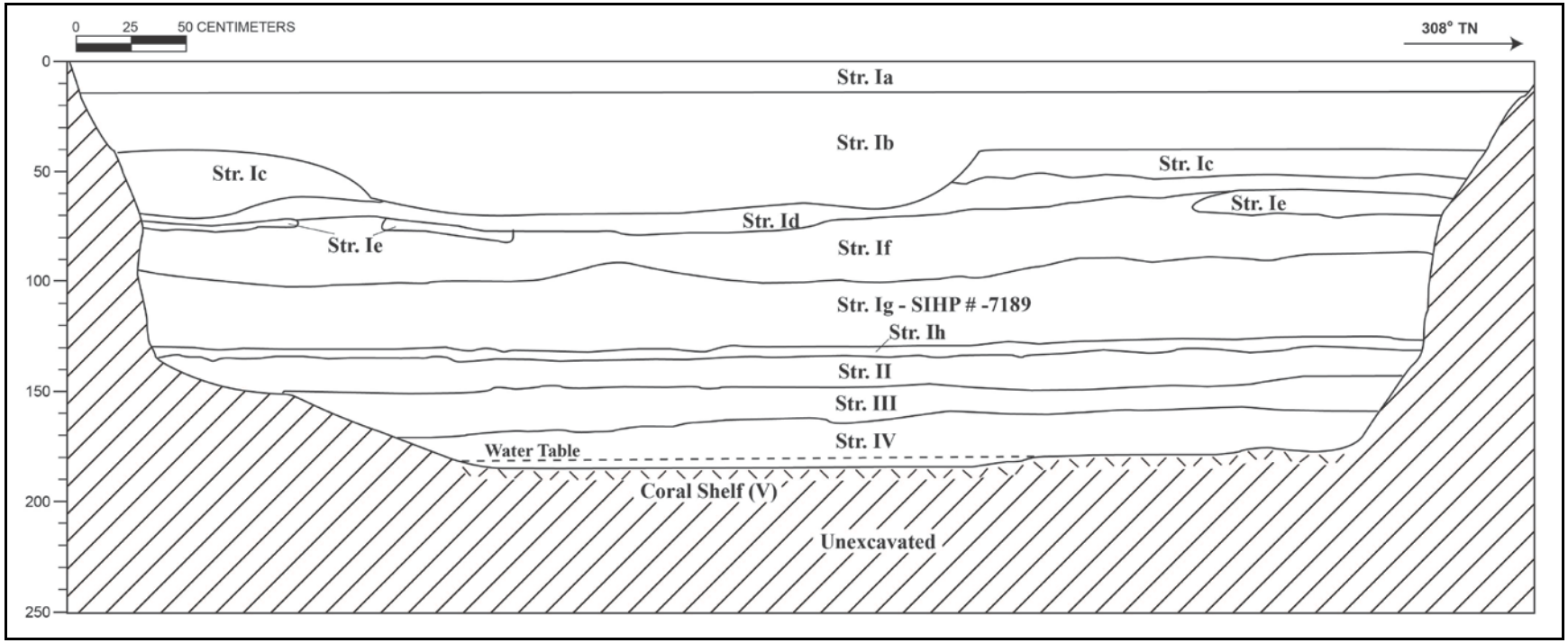
grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.25 mbs

GPR depth profiles for T-231A identified horizontal banding, commonly associated with stratigraphic layering throughout the survey area. This banding corresponds to variations in density and chemical composition within fill deposits. The profile also indicated a change in reflectivity occurring around 0.15 mbs and again around 0.6 mbs. An anomaly was observed in the profile, but was not observed during excavation and does not correspond to the utilities encountered. The maximum depth of clean signal return was approximately 0.8 mbs.

Summary: T-231A was excavated to a depth of 1.85 mbs. The water table was encountered at 1.83 mbs. Stratigraphy consisted of fill material (Ia–Ih) overlying natural layers (II–IV). The stratigraphy conformed to the USDA soil survey designation of Fill land above Strata II–IV. Faunal remains were collected from Stratum Ic, which were considered to be food remains. Artifacts collected from Stratum Ig date to the mid-nineteenth century to the early twentieth century. Stratum Ig was considered to be a component of SIHP #50-80-14-7189, a subsurface historic burned trash layer (see Volume I).

T-231A general location, view to the southeast

T-231A southwest profile wall, view to the south



T-231A southwest wall profile

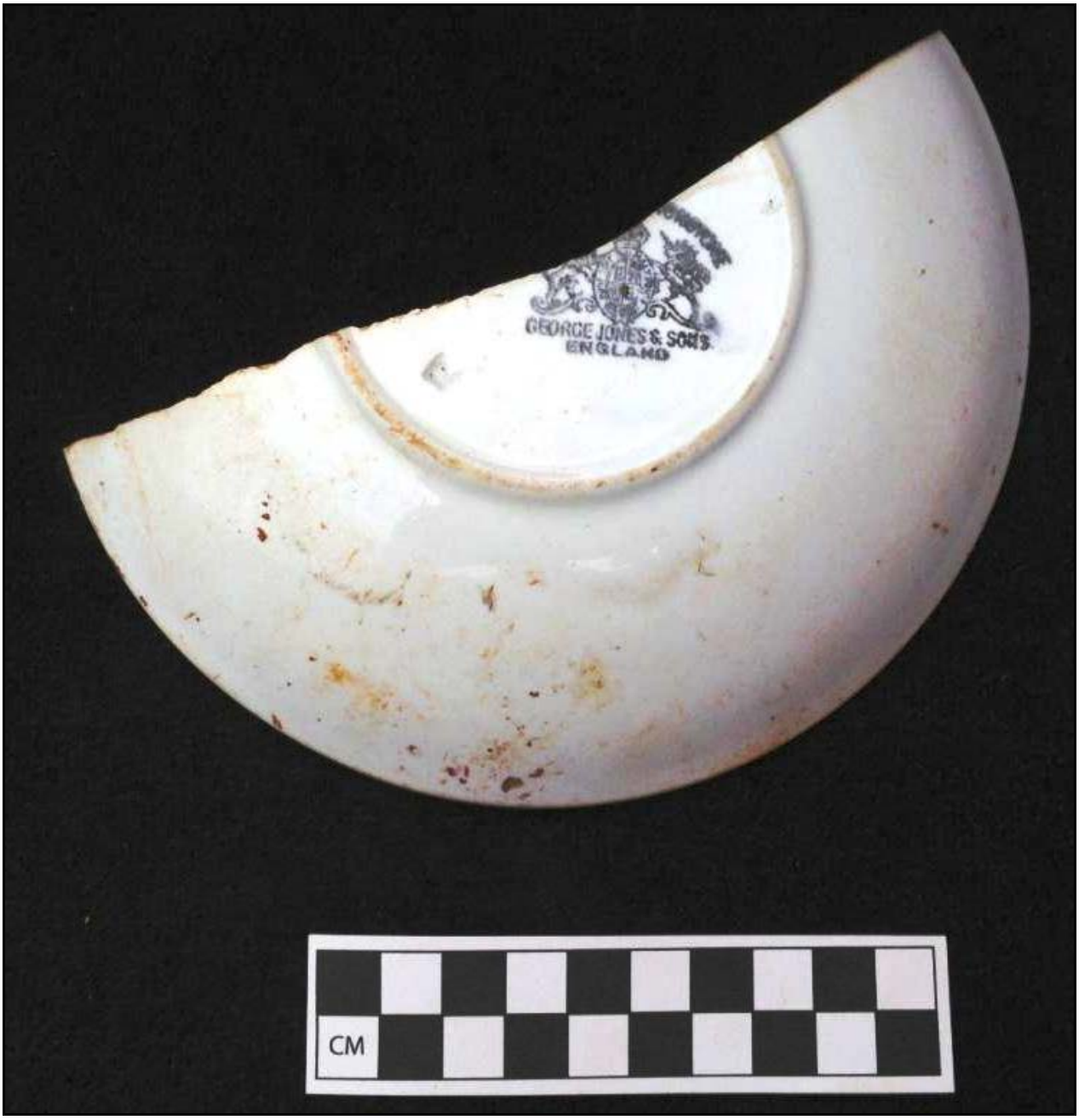
T-231A Stratigraphic Description

Stratum	Depth (cmbs)	Description
Ia	0–15	Asphalt
Ib	15–70	Fill; 10 YR 5/2 (grayish brown); extremely gravelly silty loam; structureless, single-grain; moist, loose consistency; non-plastic, terrigenous origin; abrupt, smooth lower boundary; gravel base course
Ic	42–72	Fill; 10 YR 8/2 (very pale brown); very gravelly sandy loam; structureless, single-grain; moist, friable consistency; non-plastic; mixed origin; very abrupt, smooth lower boundary; contained faunal fragments (collected); crushed coral fill
Id	63–75	Fill; 10 YR 4/2 (dark grayish brown); silty loam; weak, very fine, crumb structure; moist, friable consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary
Ie	57–82	Fill; 10 YR 2/1 (black); gravelly sandy loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; terrigenous origin; abrupt, broken/discontinuous lower boundary
If	61–103	Fill; 10 YR 3/2 (very dark grayish brown); sandy loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; mixed origin; abrupt, smooth lower boundary
Ig	91–132	Fill; 10 YR 2/1 (black); sandy clay loam; structureless, single-grain; moist, friable consistency; mixed origin; clear, smooth lower boundary; contained glass bottles, ceramic fragments, and miscellaneous items (collected); cut cow bone and rusted metal (not collected); burned trash layer; a component of SIHP #-7189
Ih	132–136	Fill; 10 YR 2/1 (black); silty clay loam; structureless, massive; moist, friable to firm consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary
II	136–150	Natural; 10 YR 8/4 (very pale brown); silty sand; structureless, single-grain; moist, very friable consistency; non-plastic; marine origin; clear, smooth lower boundary
III	150–168	Natural; 2.5 Y 8/2 (pale yellow); very gravelly to cobbly loamy sand; structureless, single-grain; moist, friable to firm consistency; non-plastic; marine origin; clear, smooth lower boundary; decomposing coral shelf
IV	168–185 (BOE)	Natural; GLEY 1 7/5GY (light greenish gray); very gravelly loamy sand; structureless, single-grain; moist, firm consistency; non-plastic; mixed origin; decomposing coral shelf; lower boundary not visible

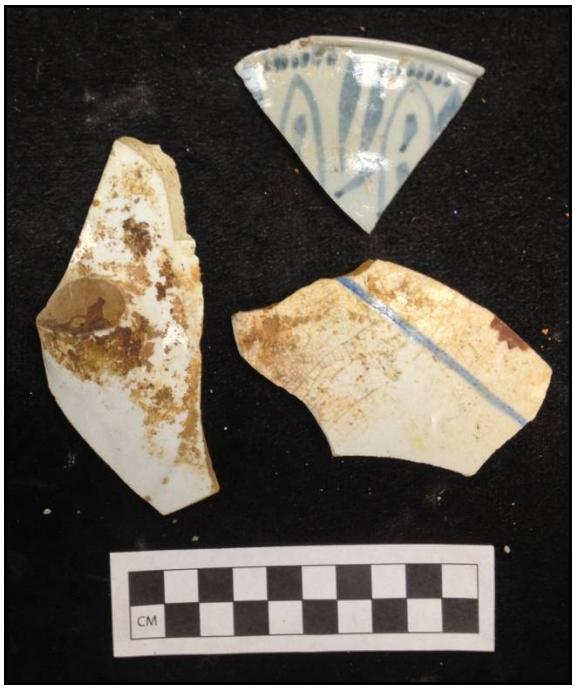
T-231A Historic Artifacts Analysis Table

Acc. #231A-A-	Prov.	Ceramic Vessel Type	Portion	No.	Paste	Origin; Age	Comments
1	T-231A, St. Ig, SIHP #-7189	Flatware – saucer with cup ring	Base–rim	1	Refined earthenware	English; 1873–1907	Ironstone; base mark: “[Royal Seal]/[IR]ONSTONE GEORGE JONES & SONS/ENGLAND”
2	T-231A, St. Ig, SIHP #-7189	Holloware – rice bowl	Body	1	Porcelain	Chinese	Bamboo motif, painted underglaze
3	T-231A, St. Ig, SIHP #-7189	Hollowware – possible large ewer	Body–rim	1	Refined earthenware	Euro-American	Whiteware; no decoration
4	T-231A, St. Ig, SIHP #-7189	Holloware – possible large bowl	Body	1	Refined earthenware	Euro-American	Whiteware; blue painted underglaze; possible Lokelani pattern
5	T-231A, St. Ig, SIHP #-7189	Hollowware – crock	Rim	1	Stoneware	Chinese	Brown slip glaze
6	T-231A, St. Ig, SIHP #-7189	Hollowware – jar	Body	5	Stoneware	Chinese	Brown slip glaze
Acc. #231A-A-	**Prov.**	**Glass Bottle Type**	**Portion**	**No.**	**Color**	**Origin; Age**	**Comments**
7	T-231A, St. Ig, SIHP #-7189	Bottle, spirits	Complete	1	Olive	1860–1890	
8	T-231A, St. Ig, SIHP #-7189	Bottle, spirits	Complete	1	Olive, dark	1860–1890	
9	T-231A, St. Ig, SIHP #-7189	Bottle, spirits	Complete	1	Olive, dark	1860–1890	
10	T-231A, St. Ig, SIHP #-7189	Bottle, spirits	Complete	1	Olive, dark	1860–1890	
11	T-231A, St. Ig, SIHP #-7189	Bottle, medicine	Complete	1	Green, light	1870s – post	
12	T-231A, St. Ig, SIHP #-7189	Bottle, spirits	Complete	1	Black	1860–1890s	
13	T-231A, St. Ig, SIHP #-7189	Bottle, spirits	Complete	1	Olive, dark	1880s–1920s	

14	T-231A, St. Ig, SIHP #-7189	Bottle, soda	Base-neck	1	Green, light	1893 ca.	Niagara Codd bottle; top broken to get marble; embossed on body in double arch: "HOLLISTER/ & CO/ HONOLULU/ HI: embossed on heel "…MAKERS/ LONDON"
15	T-231A, St. Ig, SIHP #-7189	Bottle, medicine	Complete	1	Clear	1870s-1920s	Possible pill/aspirin bottle
Acc. #231A-A-	**Prov.**	**Miscellaneous Type**	**Portion**	**No.**	**Material**	**Origin; Age**	**Comments**
16	T-231A, St. Ig, SIHP #-7189	Box lid	Complete	1	Soapstone?	Asian	Possibly for sealing paste
17	T-231A, St. Ig, SIHP #-7189	Possible lamp base	Fragment	1	Earthenware		
18	T-231A, St. Ig, SIHP #-7189	Insulator	Fragment	2	Glass		Embossed around top rim: “PAT DEC.19.1871” [patent date]; aqua color; threaded
19	T-231A, St. Ig, SIHP #-7189	Brick	Fragment	1	Fired clay		Red color; machine-made
20	T-231A, St. Ig, SIHP #-7189	Tubular item	Fragment	1	Charcoal		Compressed solid tube; possibly for drawing
21	T-231A, St. Ig, SIHP #-7189	Window	Fragment	6	Glass		Clear; small fragments
22	T-231A, St. Ic	Chert	Piece	1	Chert		Cortex on edge of chert; chert included ship ballast and strike-a-lights in the early post-Contact period



T-231A English (George Jones & Sons, England, 1873–1907) ironstone plate (Acc. #231A-A-1) from Statum Ig (SIHP #-7189), exterior; no decoration



T-231A ceramic vessel fragments, exterior; Chinese porcelain rice bowl, Bamboo motif (Acc. #231A-A-2; top) and Euro-American earthenware pitcher with broken handle and bowl fragment (Acc. #s 231-A-A-3 and A-4; bottom, left to right) from Stratum Ig (SIHP #-7189)

T-231A Chinese stoneware vessel fragments, exterior; rim (Acc. #231A-A-5; top) and body fragments (Acc. #231A-A-6; bottom) from Stratum Ig (SIHP #-7189)

T-231A glass bottles (Acc. #s 231A-A-7 through A-10) from Stratum Ig (SIHP #-7189)

T-231A glass bottle (Acc. #231A-A-11) from Stratum Ig (SIHP #-7189)

T-231A glass bottles (Acc. #s 231A-A-12 through A-15) from Stratum Ig (SIHP #-7189)

T-231A miscellaneous artifacts (Acc. #s 231A-A-16 through A-18) from Stratum Ig (SIHP #-7189)

T-231A Faunal Analysis

Acc. #	Stratum	Depth (cmbs)	Feature	Family/Class	Species	Element	Description	Modification
231A-F-1	Ic	54	-	Bovidae	*Bos taurus* (cow)	Left tibia (distal portion); ribs; spinous process	Fragments	Rib and tibia butchered (cut with metal blade)
231A-F-2	Ic	54	-	Suidae	*Sus scrofa* (pig)	Ribs; scapula	Fragments	None

4.21 Test Excavation 232 (T-232)

***Ahupua‘a*:**	Honolulu
LCA:	7712:6
TMK #:	2-1-052 [Plat]
Elevation Above Sea Level:	1.43 m
UTM:	618438.0402 mE, 2355640.178 mN
Max Length/Width/Depth:	6.09 m/0.80 m/2.40 mbs
Orientation:	43/223° TN
Targeted Project Component:	Utility Relocation
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 232 (T-232) was located within Cooke Street near the Pohukaina Street intersection. T-232 was located on property owned by the City and County of Honolulu near the southeastern corner of the historic Mother Waldron Park (SIHP #50-80-14-1388). Utilities included a gas line 2.5 m to the west and a sewer line 3.7 m to the southeast of T-232. The excavation surface was level with the surrounding surface.

Summary of Background Research and Land Use: The land use for this region consisted of taro cultivation, salt production, and fish farming. Most of the LCAs in the vicinity were small awards with house lots, *lo‘i*, and ponds. According to S. E. Bishop’s 1884 map of Honolulu, T-232 was located within the *‘ili* of Ka‘ākaukukui in LCA 7712:6/7713, which was awarded to Victoria Kamāmalu, the sister of Kamehameha IV and Kamehameha V. Baldwin’s 1883 map of Honolulu places T-232 nearly 400 m northeast of the former shoreline. T-232 was within former marshlands that extended across the Kaka‘ako coastal zone, according to S. E. Bishop’s 1884 map of Honolulu. W. A. Wall’s 1887 map of Honolulu indicates that T-232 was still within an undeveloped area with sparse urban development 165 m to the northeast. M. D. Monsarrat’s 1897 map of Honolulu showed a changing landscape, with increased urban development and street grids to the northeast. By 1919 the coastal marshlands were filled and replaced with industrial structures and urban development, according to the 1919 U.S. Army War Department Fire Control map. Urban development continued through the 1950s, with major shoreline extension starting in 1933, according to the 1933 and 1943 U.S. Army War Department maps. By 1953, T-232 was within a heavily urbanized area adjacent to Mother Waldron Park (SIHP #-1388), according to the 1953 U.S. Army Mapping Service topographic map.

Several archaeological studies have been conducted in the vicinity of T-232. A historic burned trash layer (SIHP #50-80-14-7189) and a salt pan layer (SIHP #50-80-14-7190) were identified approximately 250 m west of T-232 (Pammer et al. 2011). A post-Contact subsurface deposit (SIHP #-1388; Mother Waldron Park) was identified approximately 5 m west of T-232 (Hammatt 1998). Eleven burials (SIHP #50-80-14-5820) around Mother Waldron Park were identified during archaeological monitoring of a study area located approximately 120 m north of T-232A (Douglas 1991; Winieski and Hammatt 2000).

Documentation Limitations: T-232 was excavated to 2.40 mbs. A gas line present at 0.40 mbs prevented excavation in the northeast end of T-232. Excavation did not extend to the water table or the natural coral shelf due to unstable and collapsing sidewalls.

Stratigraphic Summary: The stratigraphy consisted of fill overlying naturally deposited sediments. The observed strata were asphalt (Ia), gravel base course fill (Ib), very gravelly silty sand fill (Ic), crushed coral fill (Id), loamy sand fill (Ie), burned trash fill (If), sandy clay loam fill (Ig), natural medium-grained sand (II), and natural gravelly sand with clay (III). The stratigraphy observed within T-232 conformed to the USDA soil survey designation of Fill land above Strata II and III. Stratum If was considered to be a component of SIHP #-7189, a subsurface burned trash layer.

Artifacts Discussion: Seven artifacts (Acc. #s 232-A-1 through A-7) were observed within Stratum If. They consist of one Chinese porcelain vessel (“Four Flowers” motif), one Asian porcelain celadon cup, three glass fragments from three bottles, one clay marble, and a polished abalone shell fragment. The bottles were all mold-blown and date from 1860 to the 1920s.

Features Discussion: No features were observed.

Terrestrial Faunal Remains Discussion: No faunal remains were collected.

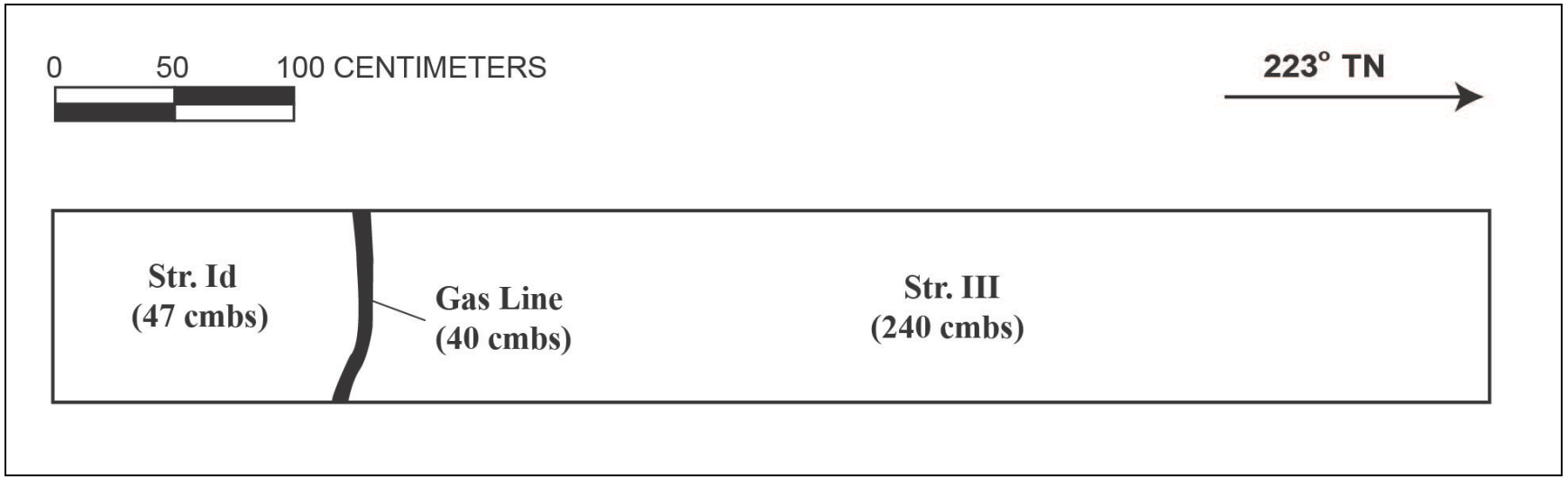
Sample Results: No sample analysis was conducted.

GPR Discussion: A review of amplitude slice maps indicated no linear features, although a gas line was encountered during excavation. Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.25 mbs.

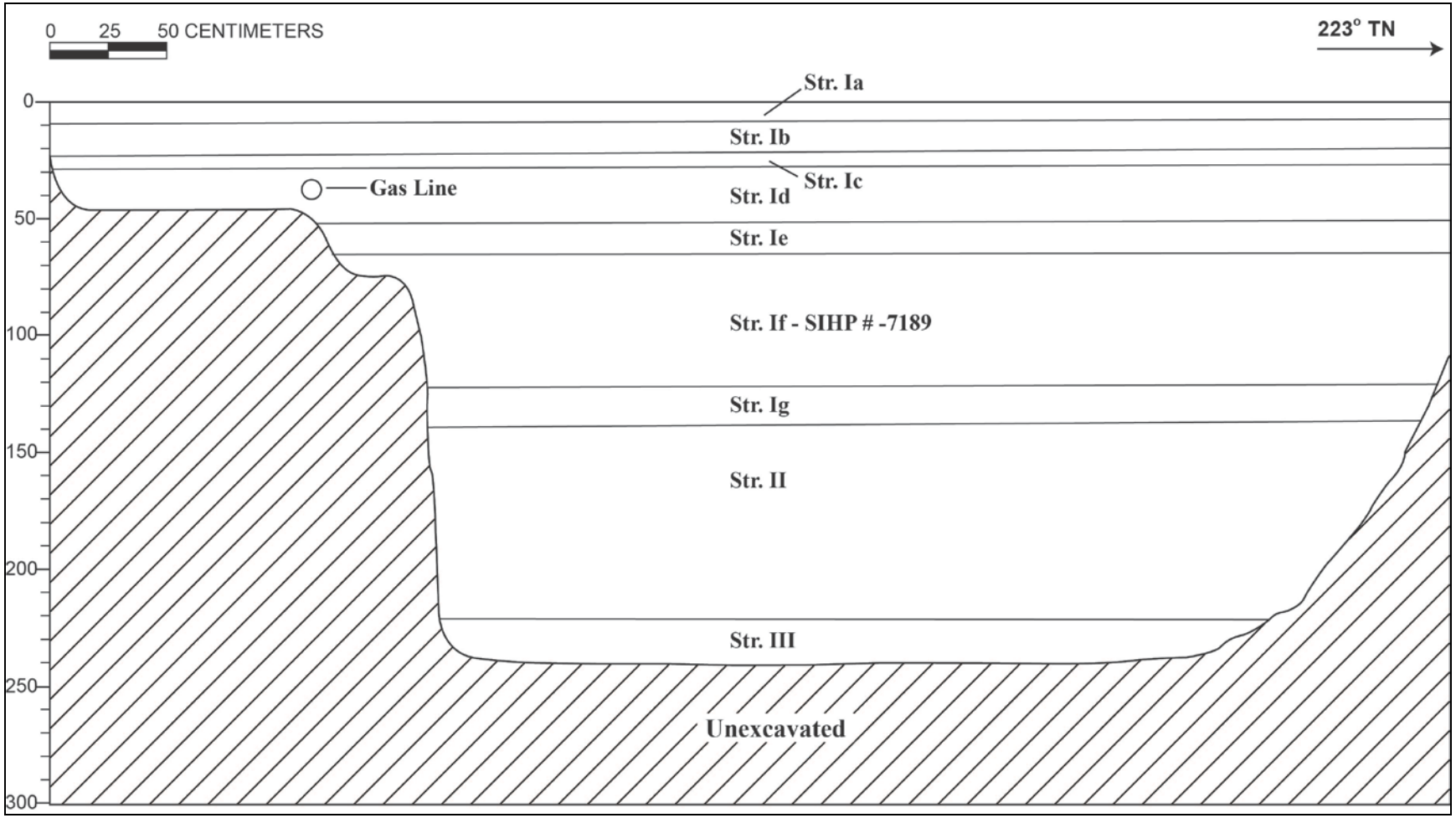
GPR depth profiles for T-232 identified horizontal banding, commonly associated with stratigraphic layering throughout the survey area. This banding corresponds to variations in density and chemical composition within fill deposits. The profile also indicated a change in reflectivity occurring around 0.25 mbs. No utilities were observed in the profile, although a gas line was encountered during excavation. The maximum depth of clean signal return was approximately 1.0 mbs.

Summary: T-232 was excavated to a depth of 2.40 mbs. Excavation was terminated above the natural coral shelf and the water table due to collapsing side walls. The stratigraphy consisted of fill strata (Ia–Ig) overlying naturally deposited sediments (II and III). The stratigraphy observed within T-232 conformed to the USDA soil survey designation of Fill land above Strata II and III. Stratum If was considered to be a component of SIHP #50-80-14-7189, a subsurface burned trash layer (see Volume I).

T-232 southeast profile wall, view to the south



T-232 plan view



T-232 southeast wall profile

T-232 Stratigraphy Description

Stratum	Depth (cmbs)	Description
Ia	0–9	Asphalt
Ib	9–22	Fill; 10 YR 5/2 (grayish brown); extremely gravelly silty sand; structureless, single-grain; moist, loose consistency; non-plastic, terrigenous origin; abrupt, smooth lower boundary; gravel base course
Ic	22–30	Fill; 10YR 5/2 (grayish brown); very gravelly silty sand; single-grain, weak to moderate, fine to medium, blocky/crumb structure; dry, weakly coherent consistency; non-plastic; mixed origin; clear, smooth lower boundary
Id	30–51	Fill; 10 YR 7/4 (very pale brown); extremely gravelly sand; structureless, single-grain; moist, very friable consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; crushed coral fill
Ie	51–66	Fill; 10 YR 3/2 (very dark grayish brown); fine- to medium-grained loamy sand; structureless, massive; weak, medium, blocky structure; friable, slightly sticky consistency; non-plastic; mixed origin; clear lower boundary
If	66–121	Fill; 10 YR 2/1 (black); sandy clay loam; structureless, single-grain; moist, friable consistency; non-plastic, mixed origin; clear, smooth lower boundary; contained glass bottles and fragments, ceramic fragments, a clay marble (collected), red brick, rusted metal fragments, cut faunal bone, a leather strip, fabric, wood, and a shoe sole (not collected); burned trash layer; component of SIHP #-7189
Ig	121–137	Fill; 10 YR 8/2 (very pale brown); silty sand; structureless, massive; moist, friable consistency; slightly plastic; mixed origin; clear, smooth lower boundary; imported hydraulic fill—thin bands (3–4cm) of 10 YR 7/2 hydraulic fill clay
II	137–200	Natural; 10 YR 6/2 (light brownish gray); medium- to coarse-grained sand; structureless, single-grain; moist, non-sticky consistency; non-plastic; marine origin; clear, smooth lower boundary; natural sand layer
III	220–240 (BOE)	Natural; gley 2 6/1 (bluish gray); fine- to medium-grained gravelly sand with clay, structureless, single-grain; moist, non-sticky consistency; non-plastic; marine origin; lower boundary not visible

T-232 Artifact Analysis Table

Acc. #232-A-	Prov.	Ceramic Vessel Type	Portion	No.	Paste; Decor.	Origin; Age	Comments
1	T-232, St. If, SIHP #-7189	Tableware – unidentified	Body	1	Porcelain	Chinese	“Four Flowers” motif; painted overglaze
2	T-232, St. If, SIHP #-7189	Hollowware – small teacup	Base–rim	1	Porcelain	Asian	Celadon glaze; blue Asian character on base
Acc. #232-A-	**Prov.**	**Glass Bottle Type**	**Portion**	**No.**	**Color**	**Origin; Age**	**Comments**
3	T-232, St. If, SIHP #-7189	Bottle, beer	Base–shoulder	1	Brown	1870s–post	Suction mark on base
4	T-232, St. If, SIHP #-7189	Bottle, spirits	Neck–lip	1	Olive	1880s–1920s	Tooled lip
5	T-232, St. If, SIHP #-7189	Vial, medicine	Base–neck	1	Aqua	1860–1920s	Dimple; turn mold
Acc. #232-A-	**Prov.**	**Miscellaneous Type**	**Portion**	**No.**	**Material**	**Origin; Age**	**Comments**
6	T-232, St. If, SIHP #-7189	Marble	Complete	1	Clay		Tan color; polished
7	T-232, St. If, SIHP #-7189	Shell – abalone	Fragment	1	Shell		Cut into thick strip and polished on three sides; unknown decorative function

T-232 II Asian porcelain fragments, exterior; Chinese “Four Flowers” motif (Acc. #232-A-1; left) and celadon glaze cup (Acc. #232-A-2; right) from Stratum II

T-232 glass bottle fragments (Acc. #s 232-A-3 and A-5, left to right) from Stratum II

4.22 Test Excavation 232A (T-232A)

***Ahupua‘a*:**	Honolulu
LCA:	7712:6
TMK #:	2-1-052 [Plat]
Elevation Above Sea Level:	1.36 m
UTM:	618410.9275 mE, 2355610.548 mN
Max Length/Width/Depth:	6.60 m/1.03 m/1.32 mbs
Orientation:	60/240° TN
Targeted Project Component:	Utility Relocation
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 232A (T-232A) was located within Cooke Street near the Pohukaina Street intersection. T-232A was located on property owned by the City and County of Honolulu near the southeastern corner of the historic Mother Waldron Park (SIHP #50-80-14-1388). One sewer line was located 2.2 m to the northwest. T-232A was shifted 0.70 m to the north and 2.7 m to the east in order to avoid an active gas line. T-232A was added to further investigate subsurface cultural deposits (SIHP #50-80-14-7189) and sand deposits observed in T-232. This test excavation also investigated a utility relocation. The excavation surface was level with the surrounding surface.

Summary of Background Research and Land Use: The land use for this region consisted of taro cultivation, salt production, and fish farming. Most of the LCAs in the vicinity were small awards with house lots, *lo‘i*, and ponds. As shown on S. E. Bishop’s 1884 map of Honolulu, T-232A was located within the *‘ili* of Ka‘ākaukukui in the LCA 7712:6/7713, which was awarded to Victoria Kamāmalu, the sister of Kamehameha IV and Kamehameha V. Baldwin’s 1883 map of Honolulu places T-232A 350 m northeast of the former shoreline. T-232A was within former marshlands that extended across the Kaka‘ako coastal zone, according to S. E. Bishop’s 1884 map of Honolulu. W. A. Wall’s 1887 map of Honolulu indicates that T-232A was still within an undeveloped area, with sparse urban development 165 m to the northeast. M. D. Monsarrat’s 1897 map of Honolulu shows a changing landscape, with increased urban development and street grids to the northeast. By 1919, the coastal marshlands were filled and replaced with industrial structures and urban development, according to the 1919 U.S. Army War Department Fire Control map. Urban development continued through the 1950s with major shoreline extension starting in 1933, according to the 1933 and 1943 U.S. Army War Department maps. By 1953, T-232A was within a heavily urbanized area adjacent to Mother Waldron Park (SIHP #-1388), according to the 1953 U.S. Army Mapping Service topographic map.

Several previous archaeological studies have been conducted in the vicinity of T-232A. A historic burned trash layer (SIHP #-7189) and a salt pan layer (SIHP #50-80-14-7190) were identified approximately 250 m west of T-232A (Pammer et al. 2011). A post-Contact subsurface deposit (SIHP #-1388; Mother Waldron Park) was identified approximately 5 m west of T-232A (Hammatt 1998). Eleven burials (SIHP #50-80-14-5820) around Mother Waldron

Park (SIHP #-1388) were identified during archaeological monitoring of a study area located approximately 120 m north of T-232A (Douglas 1991; Winieski and Hammatt 2000).

Documentation Limitations: T-232A was excavated to the coral shelf at 1.32 mbs. A gas line was observed at 0.40 mbs and extended along the entire length of the southeast wall. T-232A was widened by 0.30 m on the northwest wall to continue the excavation.

Stratigraphic Summary: The stratigraphy consisted of fill layers overlying the natural coral shelf. Observed strata were asphalt (Ia), gravel base course fill (Ib), crushed coral fill (Ic), silty sand fill (Id), gravelly clay loam fill (Ie), and sandy clay fill (If). The stratigraphy observed within T-232A conformed to the USDA soil survey designation of Fill land. Stratum Ie was considered to be a component of SIHP #-7189, a subsurface burned trash layer.

Artifacts Discussion: Sixteen historic artifacts (Acc. #s 232A-A-1 through A-16, see following table and photographs) were collected from Strata Id and Ie. Stratum Id artifacts consist of seven glass bottles/bottle fragments, all mold-blown and dated to before the 1920s. Two bottles were dated to 1874–1913. Stratum Ie ceramic artifacts included a flatware fragment made by an English company from 1853 to 1871, a Euro-American redware teapot, and an English-made stoneware ink bottle made after 1891. Miscellaneous artifacts included a toothpaste jar lid for “Cherry Tooth Paste” made by an English company between 1880 and 1900. The artifacts collected from Strata Id and Ie likely all date to the late nineteenth century. Additional historic and traditional artifacts were recovered from the bulk sediment samples (see Sample Results below).

Feature Discussion: No features were observed.

Terrestrial Faunal Remains Discussion: Faunal remains were collected from Stratum Ib (0.20–0.30 mbs), Stratum Id (0.65 mbs), and Stratum Ie (0.81–0.96 mbs). Stratum Ib contained butchered *Bos taurus* (cow) and unmodified *Canis lupus familiaris* (dog) remains. Stratum Id contained *Bos taurus*, *Canis lupus familiaris*, *Gallus gallus* (Red Junglefowl/chicken), *Rattus norvegicus* (rat), *Sus scrofa* (pig), and unidentified small mammal fragments. Stratum Ie (SIHP #-7189) contained *Bos taurus*, *Gallus gallus*, *Sus scrofa*, and unidentified medium mammal fragments. The faunal remains collected from Strata Ib, Id, and Ie were considered food remains from historic fill deposits (see Faunal Analysis Table below).

Sample Results: A total of three bulk sediment samples were collected from within T-232A, including two samples from Stratum Ie (SIHP #-7189) at 0.65–0.94 mbs (8 L) and 0.81–0.96 mbs (8 L) (from the trench floor during excavation) and one sample from Stratum If at 0.94–1.10 mbs (2 L) (from the profile sidewall). All of the bulk sediment samples were wet screened.

The bulk sample from Stratum Ie (SIHP #-7189) between 0.65–0.94 mbs contained charcoal (15.3 g), *Nerita picea* (1.4 g), *Cellana exarata* (2.0 g), naturally-occurring, water-rounded marine shell (2.0 g), wood fragments (7.6 g), a large unidentified seed (0.3 g), bottle glass (30.6 g), rusted metal fragments (37.4 g), ceramic fragments (13.2 g), a heavily-corroded possible metal coin or washer (2.6 g), a white porcelain fragment (1.9 g), possible coal or slag pieces (0.8 g), and unidentified fish bone (1.8 g).

The bulk sample collected from Stratum Ie (SIHP #-7189) between 0.81 and 0.96 mbs contained charcoal (50.3 g), fresh- or brackish-water gastropods (snails) (0.1 g), wood fragments (16.2 g), a seed pod or coating (0.1 g), a marine shell fishhook preform (0.1 g), a basalt flake (0.3 g), *Sus*

scrofa bones (0.2 g), a *Gallus gallus* bone (0.1 g), a *Rattus* sp. bone (0.1 g), unidentified fish bones (0.3 g), bottle glass fragments (32.8 g), a rusted metal fragment (118.5 g), metal fragments (33.5 g), metal stakes (20.4 g), a white and green ceramic fragment (4.9 g), possible coal or slag pieces (6.0 g), an earthenware fragment (3.4 g), a ceramic fragment with print (1.5 g), an iron ball (0.1 g), and possible marine shell midden consisting of Crustacea (2.6 g), *Nerita picea* (1.4), *Isognomon* sp. (0.4), *Tellina* sp. (0.4 g), *Tellina palatam* (4.9), *Cellana exarata* (1.9 g), bivalve (1.5 g), Ostreidae (1.3 g), and *Turbo* sp. opercula (0.7 g).

The bulk sample collected from Stratum If contained charcoal (0.5 g), naturally-occurring, water-rounded marine shell (0.7 g), and rusted metal fragments (0.1 g).

Bulk sample analysis indentified an abundance of artifacts and cultural material within Stratum Ie and a small amount of historic material within Stratum If. The sample analysis supports the identification of Stratum Ie as a culturally-enriched deposit (SIHP #-7189).

In addition to the bulk samples, marine midden was also individually collected in Stratum Ie (SIHP #-7189) from 0.65 to 1.0 mbs. Species identified consisted of *Cypraea caputserpentis* (7.3 g), *Tellina palatam* (17.6 g), Ostreidae (large) (75.3 g), large snail (5.9 g), *Cellana exarata* (20.0 g), and *Conus* sp. (22.3 g).

GPR Discussion: A review of amplitude slice maps indicated a linear feature on the southwest side of the excavation, but no utility was revealed in this area. Reflectivity was relatively uniform throughout the grid and decreased with depth except for the linear feature. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.25 mbs.

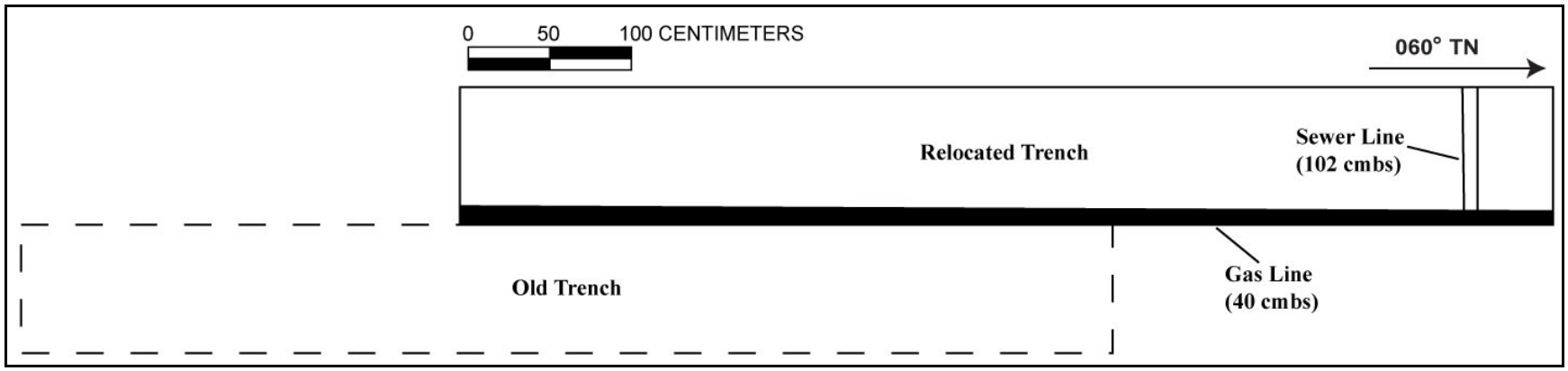
GPR depth profiles for T-232A identified horizontal banding, commonly associated with stratigraphic layering throughout the survey area. This banding corresponds to variations in density and chemical composition within fill deposits. The profile also indicated a change in reflectivity occurring around 0.2 mbs. An anomaly was observed in the profile, but was not encountered during excavation and does not correspond to the utilities that were encountered during excavation. The maximum depth of clean signal return was approximately 1.0 mbs.

Summary: T-232A was excavated to the coral shelf at a depth of 1.32 mbs. The stratigraphy consisted of fill events (Strata Ia–If). The stratigraphy observed within T-232A conformed to the USDA soil survey designation of Fill land. No natural sediments were present. Historic artifacts and faunal food remains were collected from several fill deposits. The sample analysis yielded historic artifacts, shell midden, faunal remains, and charcoal. Stratum Ie was considered to be a component of SIHP #50-80-14-7189, a subsurface burned trash layer (see Volume I).

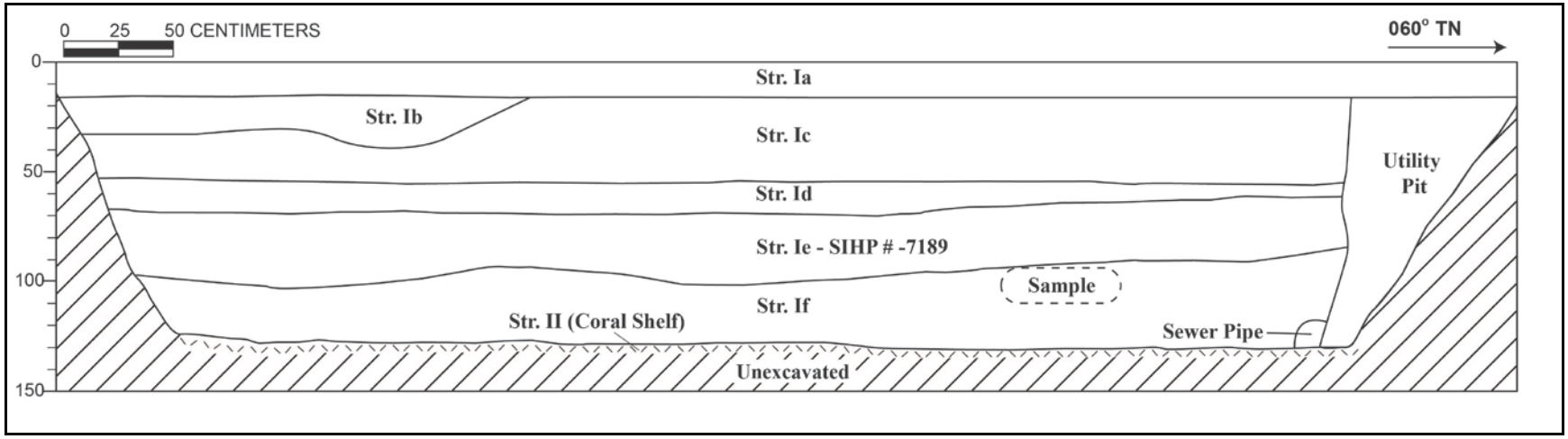
T-232A general location, view to the southwest

T-232A southeast profile wall, view to the east

T-232A northwest profile wall, view to the north



T-232A plan view



T-232A northwest wall profile

T-232A Stratigraphic Description

Stratum	Depth (cmbs)	Description
Ia	0–15	Asphalt
Utility Pit	15–132	Fill; 10 YR 5/6 (yellowish brown); very gravelly sandy loam; structureless, single-grain; moist, very friable consistency; non-plastic; mixed origin; lower boundary not visible; utility pit fill
Ib	15–38	Fill; 10 YR 5/1 (gray); extremely gravelly loam; structureless, single-grain; moist, very friable consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; contained faunal bone (collected); gravel base course
Ic	15–55	Fill; 10 YR 7/4 (very pale brown); very gravelly sand; structureless, single-grain; moist, very friable consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; crushed coral fill
Id	55–68	Fill; 10 YR 7/4 (very pale brown); silty sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt lower boundary; contained faunal bone and bottle glass (collected); fill deposit
Ie	65–102	Fill; 10 YR 3/1 (very dark gray); gravelly clay loam; moist, friable consistency; slightly plastic; mixed origin; abrupt, wavy lower boundary; contained historic artifacts and faunal bone (collected); burned trash layer; component of SIHP #-7189
If	81–132	Fill; 10 YR 6/3 (pale brown); sandy clay; structureless, single-grain; moist, firm consistency; plastic; mixed origin; abrupt lower boundary; fill deposit
II	132 (BOE)	Natural; 10 YR 7/4 (very pale brown); bedrock-limestone; structureless, massive; moist, weakly to strongly cemented; discontinuous consistency; non-plastic; marine origin; lower boundary not observed; Pleistocene coral shelf

T-232A Artifact Analysis Table

Acc. #232A -A-	Provenience	Ceramic Vessel Type	Portion	No.	Paste	Origin; Age	Comments
1	T-232A, St. Ie, SIHP #-7189	Bottle, master ink	Base–shoulder	1	Stoneware	English; 1891–1956	Impressed mark on heel, “DOULTON/ LAMBETH; 18.0 cm (H) x 7.5 cm (D)
2	T-232A, St. Ie, SIHP #-7189	Hollowware – tea pot	Base–rim	1	Coarse earthenware	Euro-American	Redware; multi-color slip glaze; “t” etched on base
3	T-232A, St. Ie, SIHP #-7189	Flatware – unidentified	Body	1	Refined earthenware	English; ca. 1853–1871	Ironstone; blue stars on base; trademark: “Warran[ted]/ Ironstone [China];” Elsmore & Forster
Acc. #232A -A-	**Provenience**	**Glass Bottle Type**	**Portion**	**No.**	**Color**	**Origin; Age**	**Comments**
4	T-232A, St. Id	Bottle, medicine	Complete	1	Clear	1870s – post	“T” embossed on base
5	T-232A, St. Id	Bottle, ink?	Complete	1	Clear	1870s – post	
6–7	T-232A, St. Id	Bottle, beverage	Complete	2	Green	1874–1913	“Johnson Liverpool, Trademark Registered” – picture of a sun or star – embossed horizontally on body; “N & Co” embossed on base; base: kick up; Nuttal & Co. mark pre-1913
8–9	T-232A, St. Id	Bottle, spirits	Complete	2	Black	1820–1890	Dimple
10	T-232A, St. Id	Bottle	Stopper	1	Clear	1870s – post	
11	T-232A, St. Id	Bottle, bourbon	Body	1	Brown	1860s – post	One piece reads “….ERS…. URBON….ILLE…K Y”
Acc. #232A -A-	**Provenience**	**Miscellane-ous Type**	**Portion**	**No.**	**Material**	**Origin; Age**	**Comments**
12	T-232A, St. Ie	Button	Fragment	1	Shell		Iridescent marine shell button; fragment with center hole
13	T-232A, St. Ie	Straps, harness?	Fragment	4	Leather		
14	T-232A, St. Ie	Lamp fragment?	Fragment	1	Glass		
15	T-232A, St. Ie	Pavement, block?	Fragment	1	Stone		

16	T-232A, St. Ie	Lid	Complete	1	Ceramic	English; ca. 1880–1900	Toothpaste jar; transfer print; monochrome version (dark green); Trade [Mark]/John Ed[wards] c. 1880–1900; “CHERRY TOOTH PASTE/ PATRONIZED BY THE QUEEN/FOR BEAUTIFYING AND RESERVING THE TEETH & GUMS/EXTRA MOIST/ PREPARED BY JOHN GOSNELL & CO LONDON” printed on lid top (Stoke-on-Trent 2013)

T-232A English (Doulton; 1891–1956) stoneware master ink bottle (Acc. #232A-A-1) from Stratum Ie (SIHP #-7189)

T T-232A Euro-American redware teapot (Acc. #232A-A-2) from Stratum Ie (SIHP #-7189)

T-232A ceramic artifacts; English Ironstone Cherry Toothpaste jar lid (John Gosnell & Co., London, 1880–1900) (Acc. #232A-A-16; left); English Ironstone flatware (Elsmore & Forster, 1853–1871) from Stratum Ie (SIHP #-7189) (Acc. #232A-A-3; right);

T T-232A ceramic artifacts (Acc. #s 232A-A-16 and A-3) from Stratum Ie (SIHP #-7189), reverse view

T-232A glass bottles (Acc. #s 232A-A-4 through A-9) from Stratum Id

T-232A bottle stopper (Acc. #232A-A-10) from Stratum Id

T-232A Faunal Description

Acc. #	Stratum	Depth (cmbs)	Feature	Family/Class	Species	Element	Description	Modification
232A-F-1	Ib	20	-	Bovidae	*Bos taurus* (cow)	Left humerus distal portion; Diaphysis section	Fragments	Butchered (cut with metal blade)
232A-F-2	Ib	20	-	Canidae	*Canis lupus familiaris* (dog)	Scapula (glenoid fossa portion)	Fragment	None
232A-F-3	Id	65	-	Bovidae	*Bos taurus* (cow)	Rib fragments; scapula fragment (two pieces mend); diaphysis section (two pieces mend); diaphysis sections; metacarpus (proximal) fragment	Fragments	Rib, scapula, and diaphysis sections were butchered (cut with metal blade)
232A-F-4	Id	65	-	Canidae	*Canis lupus familiaris* (dog)	Proximal rib fragment; diaphysis sections	Fragments	None
232A-F-5	Id	65	-	Aves	*Gallus gallus* (chicken)	Tibiotarsus fragment; left scapula; right humerus	Fragments/ complete	None
232A-F-6	Id	65	-	Muridae	*Rattus norvegicus* (rat)	Left femur fragment	Fragment	None
232A-F-7	Id	65	-	Suidae	*Sus scrofa* (pig) (juvenile)	Left scapula fragment; humerus (proximal portion) fragment	Fragments	None
232A-F-8	Id	65	-	Suidae	*Sus scrofa* (pig)	Proximal rib fragments; left mandible fragment (with 3rd	Fragments/ complete	None

Acc. #	Stratum	Depth (cmbs)	Feature	Family/Class	Species	Element	Description	Modification
						molar); molar fragment; premolar; right scapula fragment (proximal portion); cranial fragment (supraorbital arch margin); proximal phalanx; vertebral spinous process fragments		
232A-F-9	Id	65	-	Mammalia	Small mammal	Tibia/fibula (four pieces mend)	Fragments	None
232A-F-10	Ie SIHP #-7189	81	-	Bovidae	*Bos taurus* (cow)	Rib fragment; irregular fragments	Fragments	Butchered (cut with metal blade)
232A-F-11	Ie SIHP #-7189	81	-	Aves	*Gallus gallus* (chicken)	Diaphysis section fragment	Fragment	None
232A-F-12	Ie SIHP #-7189	81	-	Suidae	*Sus scrofa* (pig)	Proximal rib fragment; irregular fragments/ diaphysis section	Fragments	None
232A-F-13	Ie SIHP #-7189	81–96	-	Aves	*Gallus gallus* (chicken)	Tibiotarsal (shaft)	Fragment	None
232A-F-14	Ie SIHP #-7189	81–96	-	Mammalia	Medium mammal	Vertebra fragments; rib fragments	Fragments	Ribs butchered (cut with metal blade)